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SEPTEMBER, 1920

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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purpose for which it was founded thirty-two years ago, the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage, and be addressed: Editor, National Geographic Magazine, 16th and M Streets, Washington, D. C.

Important contributions to geographic science are constantly being made through expeditions financed by funds set aside from the Society's income. For example, immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. So important was the completion of this work considered that four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures, evidently formed by nature as a huge safety-valve for erupting Katmai. By proclamation of the President of the United States, this area has been created a National Monument. The Society organized and supported a large party, which made a three-year study of Alaskan glacial fields, the most remarkable in existence. At an expense of over $50,000 it has sent a notable series of expeditions into Peru to investigate the traces of the Inca race. The discoveries of these expeditions form a large share of the world's knowledge of a civilization which was waning when Pizarro first set foot in Peru. Trained geologists were sent to Mt. Pelee, La Soufriere, and Messina following the eruptions and earthquakes. The Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole April 6, 1909. Not long ago the Society granted $20,000 to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

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Hamilton Watch

"The Railroad Timekeeper of America"

F. O. Estell has been an Engineer on the Delaware, Lackawanna & Western since 1889. For the past twenty years he has carried a Hamilton Watch, and it has given him such splendid service that he likes to tell about it. But that isn't unusual—*most* Hamilton owners are like that. *Any* man or woman that acquires a Hamilton Watch is sure to find increasing pride in its accuracy; and appreciation of its dependability will grow with its use.

Suppose an Engineer failed to catch *his* train!

Imagine your hurrying into a railroad station only to be told that your train isn't ready—that the engineer or conductor has been late in getting to work that morning.

But railroad men are human. It's no easier for them to be punctual than for you—except that they have been helped to an appreciation of the importance of minutes by the accurate watches they carry.

A really accurate watch would help *you*. It would be a convenience, a source of pride, a constant urge to punctuality. Why not get a Hamilton? The Hamilton is probably the most accurate watch made, and therefore is the first favorite of railroad men everywhere.

The Hamilton Watch makes an ideal gift—a subtle compliment to those who have already achieved, an inspiration to younger folks, a daily and life-long reminder of your affection or esteem. On any occasion when a gift is to be made, a Hamilton Watch would be fitting and appropriate.

There's a model in the Hamilton line to suit every taste and purpose. Prices range from $40 to $200. Movements alone, $22 (in Canada $24.00) and up. Your jeweler will be glad to show you some of the many Hamiltons at any time.

Send for "The Timekeeper"—an interesting booklet about the manufacture and care of fine watches. The different Hamiltons are illustrated, and prices given.

HAMILTON WATCH COMPANY - - - *Lancaster, Penna.*

XUM

FAIRBANKS-MORSE

Dependable service has established "Z" engine dominance

The American farmer today is using more than two hundred and fifty thousand Fairbanks-Morse "Z" engines.

He lights his home with the electricity it provides, operates with it his separator, churn, feed-grinder and ensilage cutter. His sprayer is likely to be powered with a "Z" engine. In the South it loads his sugar cane and performs a host of other labor-saving tasks.

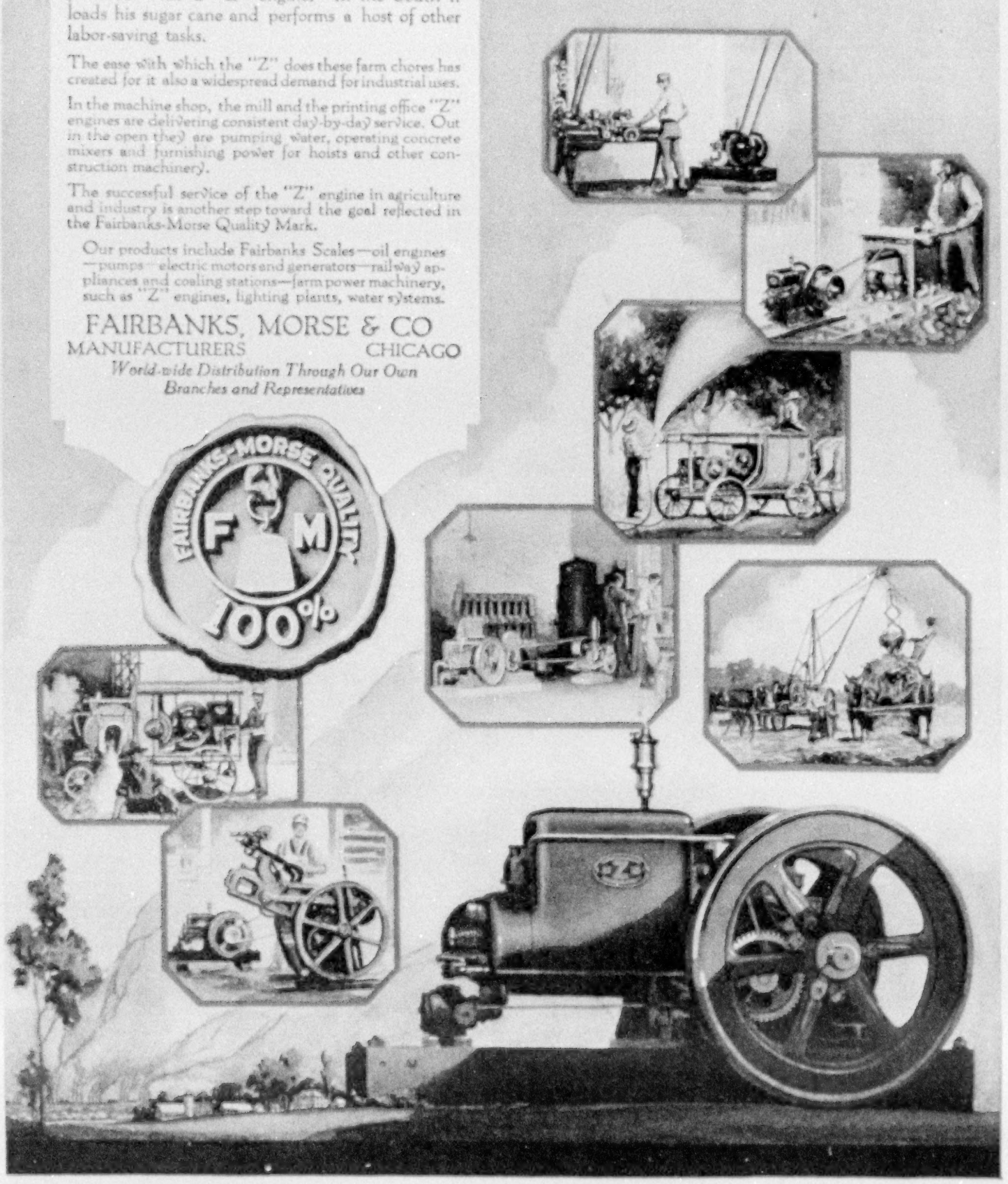
The ease with which the "Z" does these farm chores has created for it also a widespread demand for industrial uses.

In the machine shop, the mill and the printing office "Z" engines are delivering consistent day-by-day service. Out in the open they are pumping water, operating concrete mixers and furnishing power for hoists and other construction machinery.

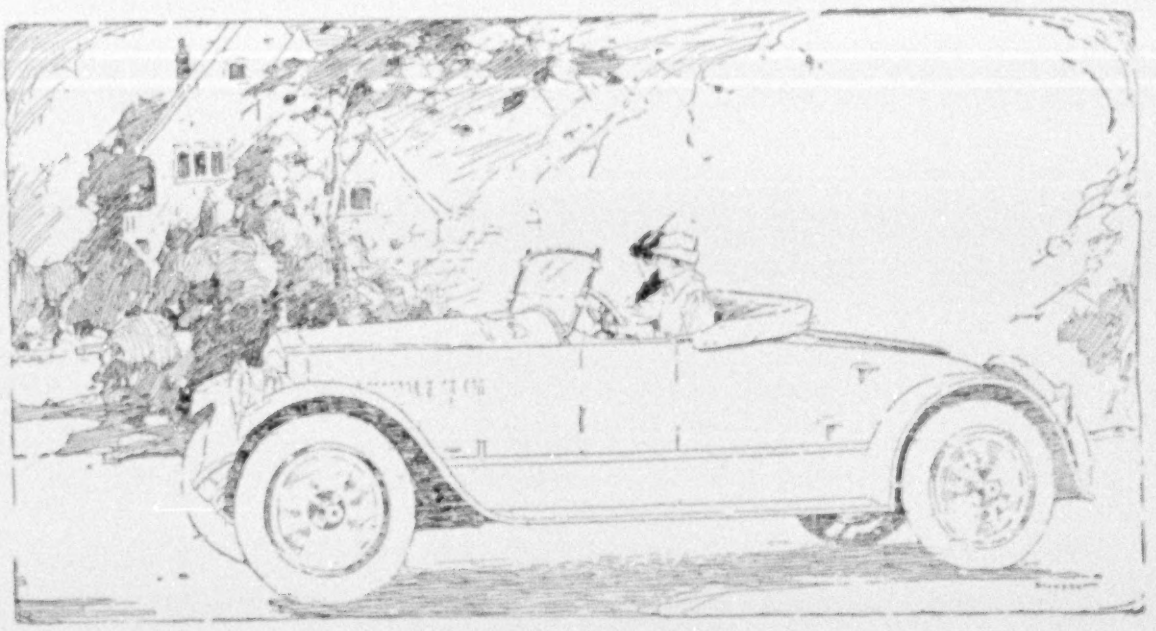
The successful service of the "Z" engine in agriculture and industry is another step toward the goal reflected in the Fairbanks-Morse Quality Mark.

Our products include Fairbanks Scales—oil engines—pumps—electric motors and generators—railway appliances and coaling stations—farm power machinery, such as "Z" engines, lighting plants, water systems.

FAIRBANKS, MORSE & CO
MANUFACTURERS CHICAGO
World-wide Distribution Through Our Own Branches and Representatives



"Mention The Geographic—It identifies you"



Who is the Judge of Good Taste

A GREAT designer once said: "Good taste comes of wisdom and intuition." What about the design of the average motor car? Is it born of artistic genius or a desire to be different?

It is a question for the motor car buyer to consider. How soon will his car be out of date?

Packard answers the question at once. Packard design is fundamental with the car—not grafted onto it.

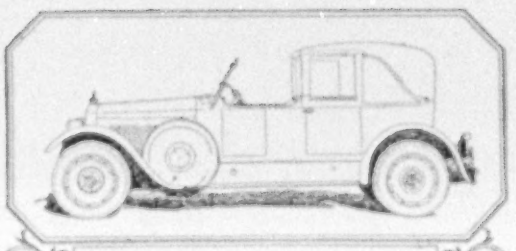
Lines may change, and have. But the *character* of the Packard has not changed for sixteen years.

At the Packard plant the first principle of distinction is quality. Hand-buffed, whole-hide leather for upholstery, instead of machine buffed "splits." Double thick material for tops. Nickeled bronze fittings, designed and made as jewelry might be. Coach work by craftsmen rather than body building by machines.

In the *London Daily Mail* recently an Englishman paid a tribute to the Packard method of building high grade cars. He wrote: "It is for America an expensive car, but, compared with the same class of car at home, it is decidedly cheaper."

The fact of the matter is this: If the Twin-Six were built in Europe with European methods it would be higher priced than even the most expensive European car.

PACKARD MOTOR CAR COMPANY · DETROIT



Appearance: Many famous designers have drafted individual bodies for the TWIN-SIX—but one and all have invariably maintained the PACKARD character

ALMOST any "eight" is a good performer. For the multi-cylinder principle operates like running oil—smoothly and silently.

That's what everyone requires. But—

Has it occurred to you that there are radical and fundamental differences in eights?

The Apperson design gives to the world eight-cylinder performance, ***plus.***

For this motor, while possessing all the virtues of the Eight, operates with the thrift of the Four.

It's all in the design. Eighty parts have been eliminated.

For example, there is but one cam shaft and only a pair of cam gears meshed direct. There is no chain.

This motor is two small, simple fours merged into one at the base.

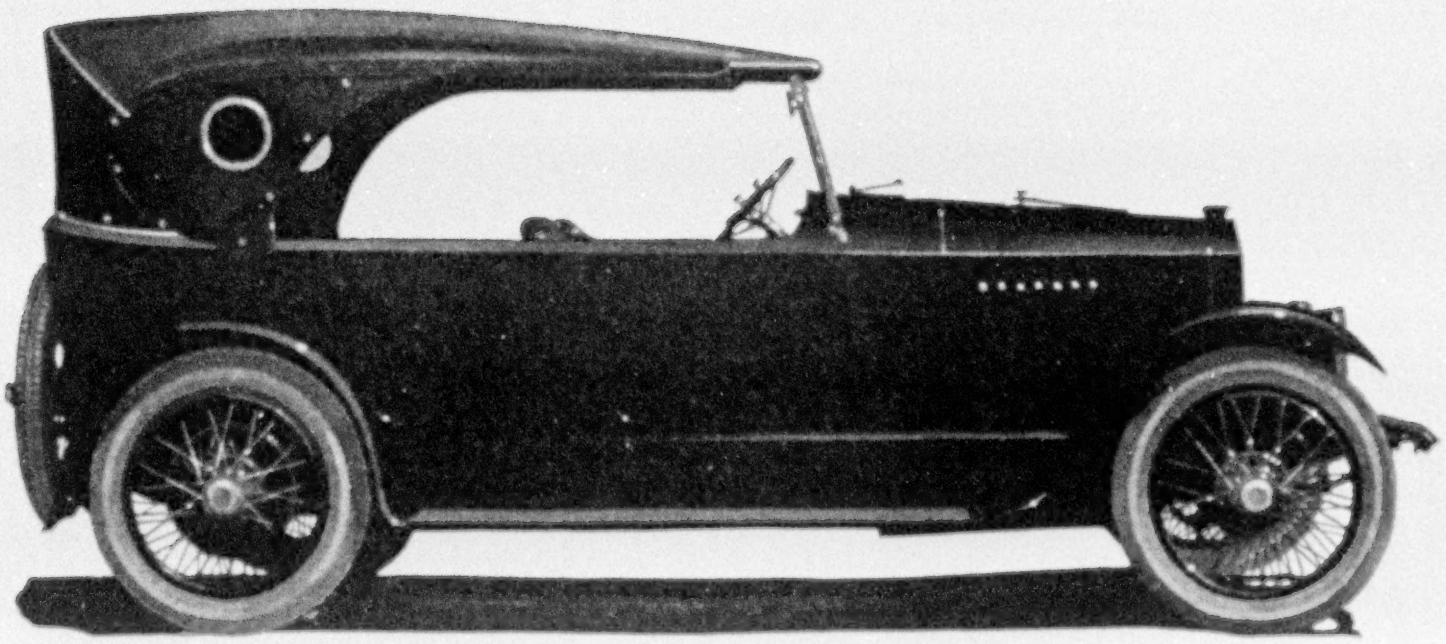
Result! A rare combination of Eight smoothness with the advantage of the strictest Four economy.

Drive an Apperson first—then decide

APPERSON BROS. AUTOMOBILE COMPANY, KOKOMO, IND.
Export Dept.: One Hundred West Fifty-Seventh Street, New York City

The Apperson is one of the few fine cars built complete in one plant. The Apperson ideal is thus carried out to the smallest detail.

Apperson bounds in high from 1 mile an hour to 40 in 20 seconds. From a 40-mile speed comes to a dead stop in 4 seconds. Turns in 38¼ feet.



APPERSON

THE EIGHT WITH EIGHTY LESS PARTS

"Mention The Geographic—It identifies you"

Five Joys a Day

Which Bubble Grains Can Bring

Millions of people in these summer days revel in Puffed Grain delights. Morning, noon, and night—in a dozen ways—they serve these fascinating foods.

Here are grain foods puffed to bubbles—airy, flaky, flimsy. They crumble at a touch, then melt away into almond-flavored granules.

Two are whole grains. All are steam-exploded. Every food cell has been blasted for easy, quick digestion. The three Puffed Grains are in these ways the finest foods created.

Two Morning Joys

Puffed Grains with cream and sugar—the most delightful cereal dish that children ever tasted. And the three Puffed Grains supply ceaseless variety.

Also mix with your berries. The flaky, flavory morsels add what crust adds to a shortcake. You are missing much if you serve fruit without this nutty blend.

Two Evening Joys

Puffed Wheat in milk is the supreme dish for supper or for bedtime. It means whole wheat kernels puffed to eight times normal size. Being toasted they are flavory, and with every food cell blasted they are easy to digest.

Puffed Rice or Corn Puffs double the delights of ice cream. These fragile dainties fairly melt into the cream. And they add a flavor which suggests a toasted nut-meat puffed.

They are also used like nut-meats in home candy making.

All Day Long

Also crisp Puffed Grains and douse with melted butter. Then children eat them like salted nuts. Thus these grain foods largely displace confections.

Made by Prof. Anderson's process—shot from guns. A hundred million steam explosions occur in every kernel. The best-cooked grain foods in existence, and the most enticing.

Puffed Wheat

Puffed Rice

Corn Puffs

All Bubble Grains

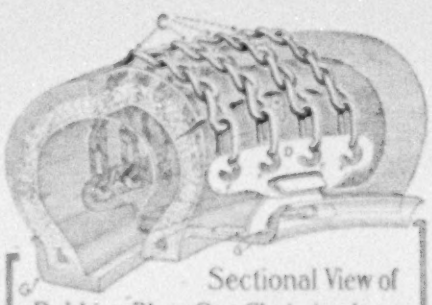
The Quaker Oats Company

Sole Makers

(3408)

Three Automobile Necessities

Weed Tire Chains, Weed Chain-Jacks and Dobbins Blow-Out Chains



Sectional View of
Dobbins Blow-Out Chain in place

A - Main Plate
B - Bent Lip on Main Plate
C - Cross Chains
D - Second Plate
E - Auxiliary Hook
F - Curved Slots permitting adjustment for due amount of tension
G - Rim of wheel
H - Inner Patch
J - Blow-out

PRICE LIST

$1.00 each for 3" and 3½" tires
1.50 " " 4" and 4½" "
1.75 " " 5, 5½ and 6" "

If your dealer does not have them, write us and we will see that your needs are supplied

"Weed Tire Chains, Mr._____, have safeguarded you and your family from skidding accidents for many years. They've given your cars traction in sand, mud, snow and on wet, greasy, slippery pavements. They are good old friends, indeed.

"Weed Chain-Jacks have minimized the labor of tire changing for you and your wife. To lift a car with a Weed Chain-Jack, you give a few easy pulls on its endless chain. To lower, you simply pull the chain in the opposite direction. Up or down, there's no labor.

"Dobbins Blow-Out Chains complete the trio of 'Auto Necessities.' They are often referred to as a 'Spare Tire in the Tool Box.' When your last spare tire 'goes bang,' you don't have to run on the rims or wait on the road for a new shoe. You can quickly and securely hold the worst blow-out with this wonderful device and go merrily on your way. You'll try them? Good! They only cost $1.50 for your 4½ inch tires. Yes, that includes an inner patch. You also want a folder descriptive of them to give to a friend. I am sorry to say that I haven't one left. I'll order a supply of them today from the

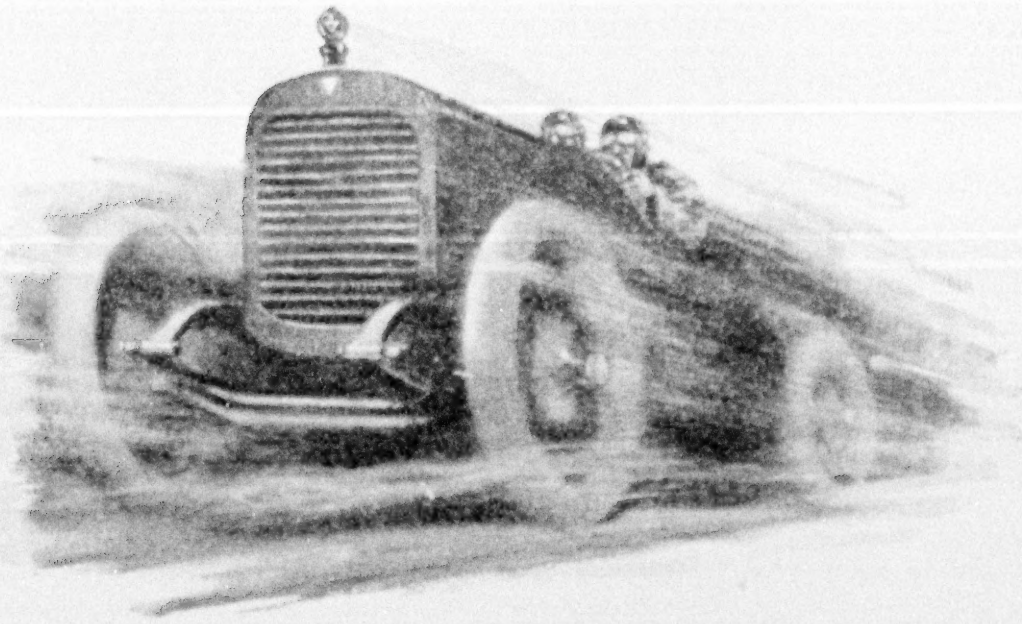
American Chain Company, Inc., Bridgeport, Connecticut

In Canada: Dominion Chain Company, Limited, Niagara Falls, Ontario

Largest Chain Manufacturers in the World

The Complete Chain Line—All Types, All Sizes, All Finishes—From Plumbers' Safety Chain to Ships' Anchor Chain.

General Sales Office: Grand Central Terminal, New York City
District Sales Offices: Boston Chicago Philadelphia Pittsburg Portland, Ore. San Francisco



Performance After All the Final Test

Hudson Proves it in Contest and Service

Remember Hudson made no tests for the mere victory of individual entries.

Even fame as the greatest endurance car was not sought as a principal motive.

Such records as the Super-Six established in traveling 1819 miles in 24 hours or in twice crossing the continent—7,000 miles—in ten days, twenty-one hours, were but incidental to the real purpose.

Not Victory But Knowledge the Aim

It was to prove by such trying tests in the period of a few hours or days the reliability to be expected from normal driving in months or years.

And it was to profit by that experience, so that constant improvements might be made in motor car design and construction.

It is well to note in this connection that though a vast improvement has resulted in Hudsons, those first models which established its fame in speedway and hill-climbing contests remain unmatched by any other car. And doesn't that emphasize the fact that those abilities which mean so much in car quality are still exclusive to Hudson?

They stand for a triumph of type which even before many refinements had brought it up to the Hudson standard of today, possessed a capacity and endurance that no other car has proved.

Now is added the confirming judgment of more than 100,000 Hudson owners, who daily see these qualities expressed in the smooth uninterrupted service of their cars.

The true building, taught by Hudson's great tests, accounts for the way it endures the hardest service, free from mechanical annoyance, and year after year retains the same dependable performance ability and distinction in action that made it the largest selling fine car in the world.

And this reliance in Hudson is a tribute to no other car. For its ability is held exclusive through the patented Super-Six motor that no other can use.

Hudson Motor Car Company, Detroit, Michigan

(3090)

"Mention The Geographic—It identifies you"

One-Half Million Builders of Good Will

Dodge Brothers business has just reached and passed another milestone in its history.

In a little over five years more than one-half million Dodge Brothers Motor Cars have been placed in the hands of owners.

If this sales record represented the appeal of a price, the total would not be particularly impressive.

The important thing is that the car is not thought of in terms of price, but in terms of value

How often you hear the car spoken of — and how seldom the price!

It is the quality of thought that surrounds it which makes this success noteworthy.

Because people think well of these cars, it is still impossible for Dodge Brothers to build enough of them.

Seldom has there been a finer example of the force of friendly thoughts.

It is an inspiration and an encouragement to build well—because the reward, in America, is so great and so sure.

With nothing but good will toward them in American homes — how could Dodge Brothers do less than they have done?

Nothing has checked or hindered for so much as a single week, the continued bestowal of this recognition and reward.

The eagerness to own the car is greater today than it ever has been.

The reason is not far to seek.

Take first the mere numerical ownership.

Remember that the satisfaction of one-half million owners is not casual, but deep and profound.

Multiply them by the average family of even three.

Remember that all of these are warm friends.

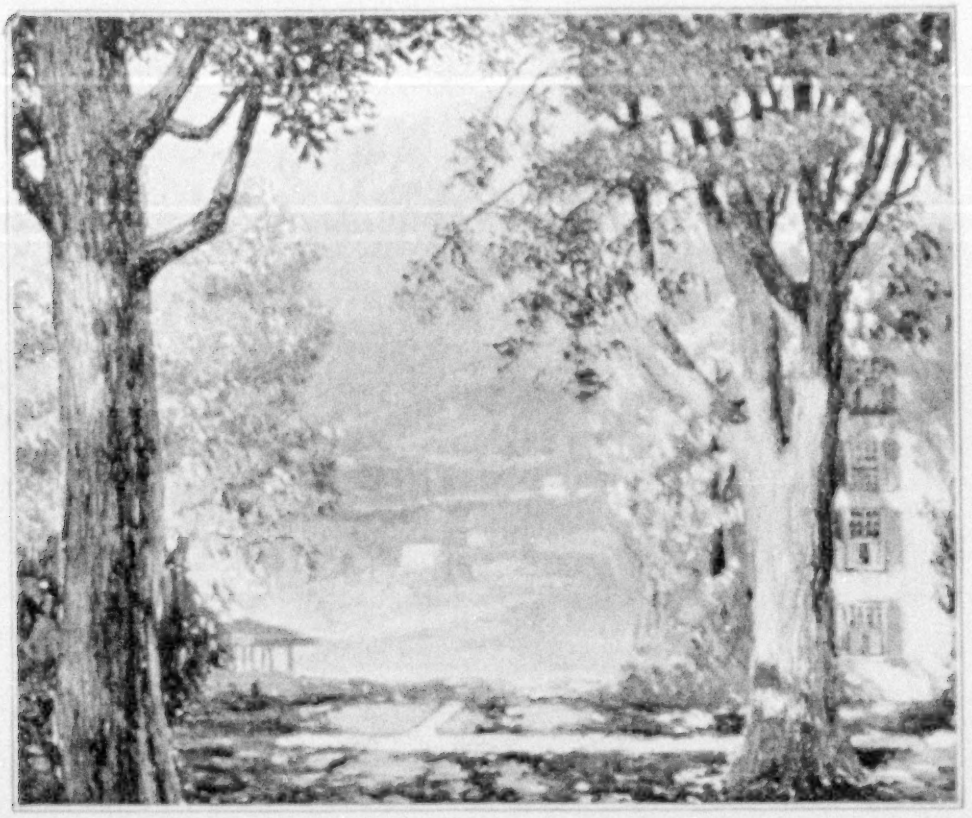
Then think of that leaven of thought leavening the whole mass.

You will begin to understand, then, why Dodge Brothers have been building new buildings ever since the business began.

You will understand why the works in which the car is built are still steadily spreading and expanding.

You will get an idea of how much men can do when the homes of America are solidly behind them.

Dodge Brothers, Detroit



Reproduced from a painting of the grounds of the Equinox Hotel, Manchester, Vt.

DAVEY Tree Surgeons are not mere craftsmen. They are trained in the science of their profession. Not only are they diligent workers because they love their work, but they operate with precision and conscious accuracy because of the scientific knowledge that is trained into them. They combine science and skill to a rare degree.

The reason for this is the Davey Institute of Tree Surgery which is maintained for the exclusive purpose of giving scientific accuracy to the skilled workmen in the Davey organization. It represents a large and continuing investment in high-standard service which is the steady purpose behind it. There is no other school in the world that teaches the science of Tree Surgery or trains real Tree Surgeons. In fact, if there were any other proper training school, it would not be necessary to maintain this one.

The course is confined to trees—practical and scientific facts about trees and their troubles and the most advanced methods of treatment. There is nothing superfluous and nothing vital is neglected. It is a necessary and fitting complement to John Davey's great art of Tree Surgery. John Davey, whom all the world honors as the "Father of Tree Surgery," created the art that saves trees. The Davey Institute of Tree Surgery has made his art an educational reality and furnishes for the Davey organization scientific Tree Surgeons of great practical skill.

For your priceless trees you can afford nothing less than this. It is your guarantee against risk of experiment, your protection against mistakes or guesswork, your assurance of real Tree Surgery service, *proved* by many years of successful practice. A careful examination of your trees will be made by appointment.

THE DAVEY TREE EXPERT CO., Inc., 1509 Elm St., Kent, Ohio

Branch Offices with telephone connections: New York City, Astor Court Building; Chicago, Westminster Building; Baltimore, American Building; Philadelphia, Land Title Building, and Boston. Write nearest office

Among prominent persons served by Davey Tree Surgeons are

CHILDS FRICK
WEST POINT MILITARY ACADEMY
ALEXANDER LAUGHLIN
MRS. GEORGIA TIMKEN FRY
GIRAUD FOSTER
ANDREW ADIE
NORTH CAROLINA STATE CAPITOL
MAURICE L. ROTHSCHILD

JOHN DAVEY
Father of Tree Surgery

Permanent representatives available in districts surrounding Boston, Springfield, Lenox, Newport, Hartford, Stamford, Albany, Poughkeepsie, White Plains, Jamaica, Montclair, New York, Philadelphia, Harrisburg, Baltimore, Washington, Richmond, Buffalo, Toronto, Pittsburgh, Cleveland, Detroit, Cincinnati, Chicago, Milwaukee and St. Louis. Canadian address: 252 Laugauchitere West, Montreal.

DAVEY TREE SURGEONS

Every real Davey Tree Surgeon is in the employ of The Davey Tree Expert Co., Inc., and the public is cautioned against those falsely representing themselves. An agreement made with the Davey Company and not with an individual is certain evidence of genuineness

XUM

Are Car Owners too Easily Satisfied with their Tires

If the front tire of the car at the left should blow out several days after striking this stone at speed, its owner would probably be at a loss to know what caused it.

What often happens in a case like this is that the inner plies of cord or fabric are ruptured, leaving the tire ripe for a complete breakdown, if not immediately attended to.

IN every community of any size there are two types of tire dealers—one who encourages his customers in their search for the best and one who tries to persuade them to be satisfied with what they have.

The first man is selling a service; the second, tires.

* * *

There are still too many motorists who meekly accept the blame for a tire that has worn out before its time.

They will listen when the dealer tells them of all the varying conditions that a tire has to undergo.

They will agree when he pictures them as lucky that they got what they did out of a tire.

Not one motorist in five has yet found out what a tire is really capable of—how much he really has a right to expect from his tires.

* * *

The great mass of motorists in this country are just beginning to wake up to the fact that you can't encourage waste and have economy at the same time.

They are beginning to find out for themselves what makes for economy in tires.

And they are going to the dealer who not only sells good tires to the man who insists upon them, but who *refuses to have anything but good tires* in his store.

* * *

From the beginning the whole weight of the United States Rubber Company—the largest rubber manufacturing concern in the world—has been thrown on the side of the *good* dealer.

Backing him first and last with all of its great and varied resources—greater and more far-reaching than those of any concern in the business.

And looking forward with confidence to the time when motorists *everywhere* will insist upon a higher standard of tire service.

United States Tires

United States Rubber Company

Fifty-three Factories

The oldest and largest Rubber Organization in the World

Two hundred and thirty-five Branches

It is of course scarcely reasonable to expect that LAFAYETTE's performance should conspicuously eclipse that of every other fine car.

Automobile building has reached a state where quiet, smooth and reliable mechanical action is not the private possession of any one manufacturer.

The accustomed motorist will, however, find in LAFAYETTE certain superiorities of behavior that he has not enjoyed in other cars he has owned.

Driving the car, he will feel an uncommon security as he takes the corners and abrupt curves, even at great speed, without sway, pitch or roll.

He will note that the wheels follow the undulations of the road without bouncing, while the body rides poised as in flight above the sensitive springs.

On hill or level he will enjoy, in every duty to which he puts the car, an instant, invariable and strainless response to his commands.

Braking hard or softly, he will feel the car float to a gentle stop without chattering of brake-bands or the familiar drum of rear wheels on the earth.

Every element in the competent action of LAFAYETTE is a natural consequent of the expert engineering that produced the car.

How agreeably this engineering translates itself into actual performance, you will know when first your LAFAYETTE moves forward under your control.

LAFAYETTE MOTORS COMPANY at *Mars Hill* INDIANAPOLIS

LAFAYETTE

"Mention The Geographic—It identifies you"

Best Funds for TRAVELERS

"A·B·A" American Bankers Association Cheques

Safe
Good Everywhere
Convenient
Self-Identifing

For further particulars write
BANKERS TRUST COMPANY
New York City

General Motors Trucks

USERS of motor trucks nowadays are fast realizing that it is most economical to buy a truck of highest grade.

What may seem a low priced truck may be an expensive, short lived truck, after all.

A GMC truck means unusual economy as to both first cost and cost of operation.

Motor trucks which will run 30,000 to 35,000 miles with practically no repairs are indeed economical. Many a GMC has done this.

GMC Trucks are built in a factory where genuine quality is the first consideration.

GENERAL MOTORS TRUCK COMPANY

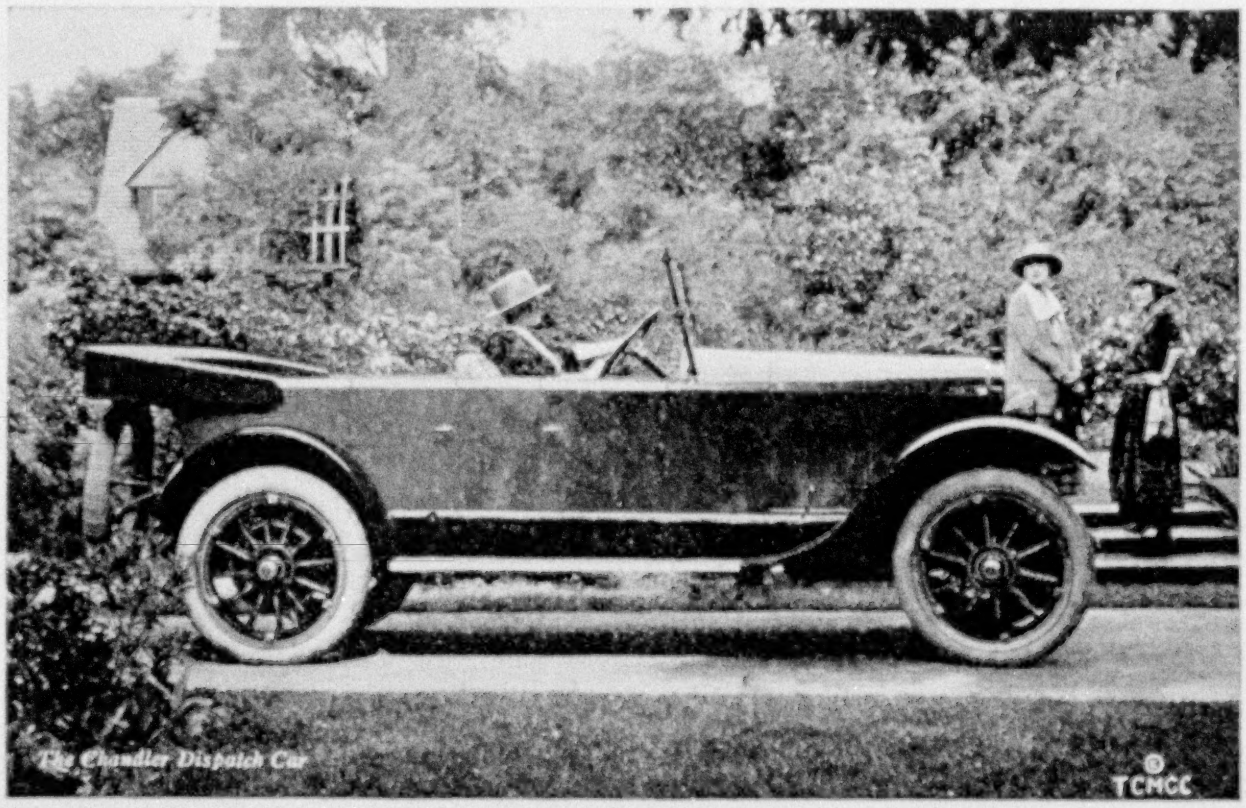
One of the Units of the General Motors Corporation

PONTIAC, MICHIGAN

"Mention The Geographic—It identifies you"

CHANDLER SIX

Famous For Its Marvelous Motor



The Right Car at the Right Price
Chandler is the First Choice

THE Chandler Company has devoted itself for seven years to the determined policy of producing, and continuing to produce, the best six at the fairest price. And it has succeeded with distinction in this devotion.

Featured by its exclusive Chandler motor, constantly developed and refined but never radically changed, and by its sturdy chassis construction throughout, the Chandler has steadfastly held its place among fine cars and gone forward into a position of unquestioned leadership among sixes.

Satisfactory service, under any and all conditions, in the hands of its more than eighty thousand owners, is the best proof of Chandler worthiness.

If You Will Investigate Carefully,
The Chandler Will Be Your Choice

SIX SPLENDID BODY TYPES

Seven-Passenger Touring Car, $1995 *Four-Passenger Roadster, $1995*

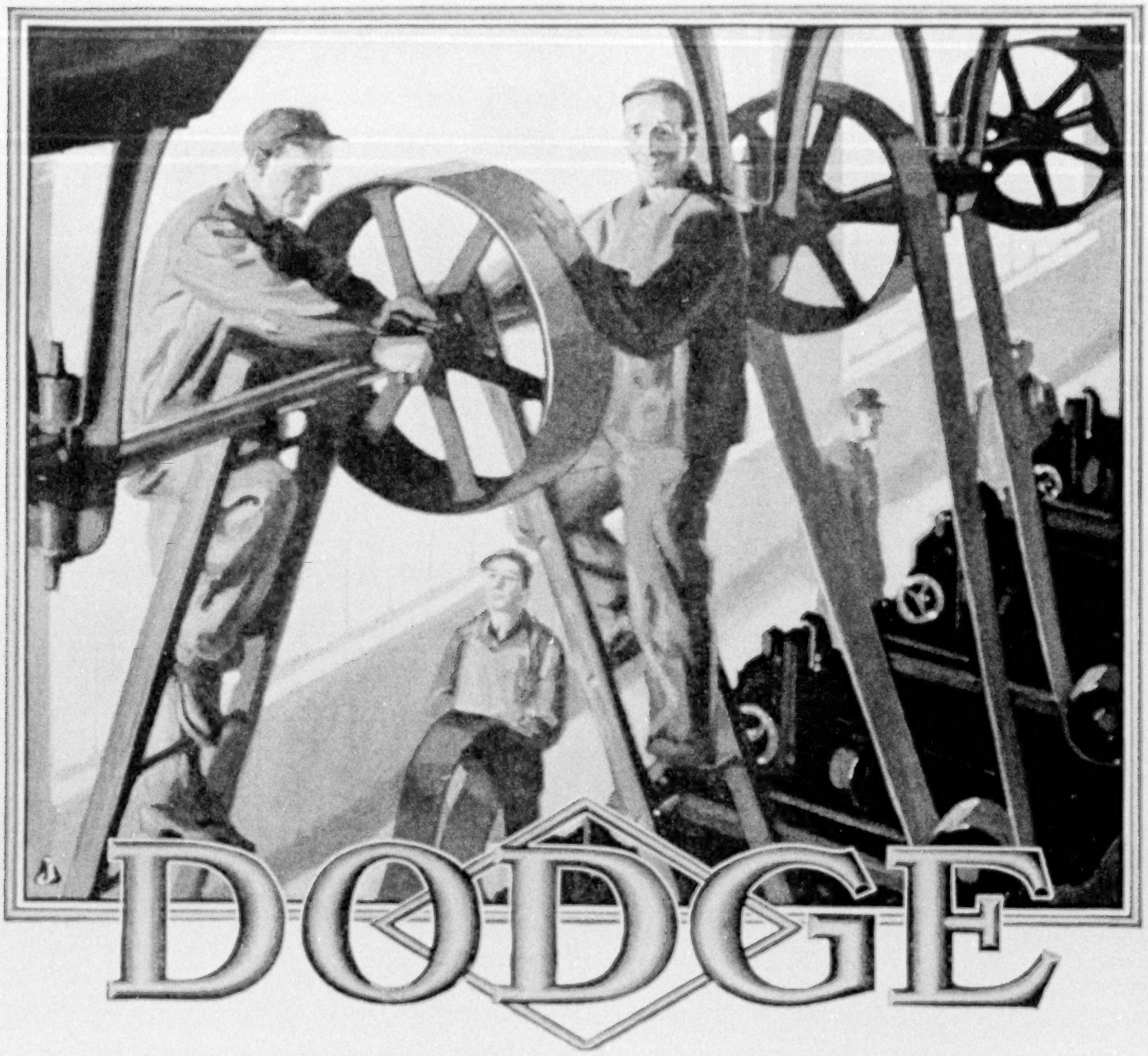
Four-Passenger Dispatch Car, $2075

Seven-Passenger Sedan, $2995 *Four-Passenger Coupe, $2895* *Limousine, $3495*

(All prices f. o. b. Cleveland, Ohio)

CHANDLER MOTOR CAR COMPANY, CLEVELAND, O.

Export Department: 5 Columbus Circle, New York Cable Address: "CHANMOTOR"



Dodge Products guarantee *continuous* production; Dodge dealers and Dodge warehouses insure *immediate* production.

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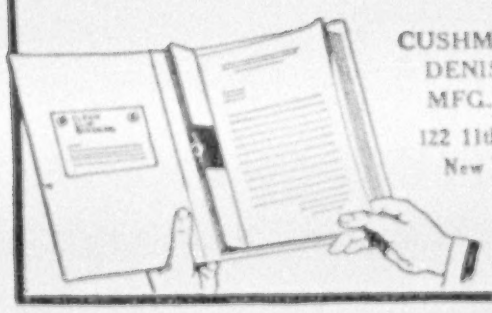

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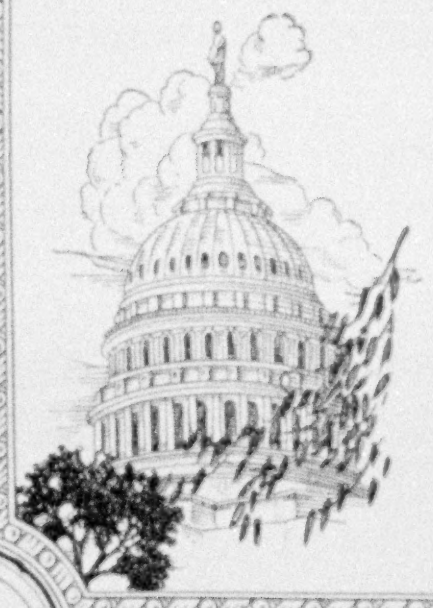

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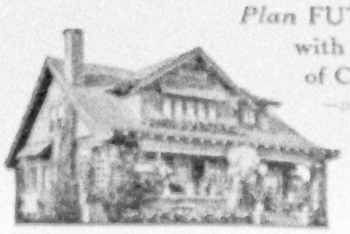

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RIO DE JANEIRO, IN THE LAND OF LURE

By Harriet Chalmers Adams

Author of "Picturesque Paramaribo," "Kaleidoscopic La Paz," "The First Transandine Railroad from Buenos Aires to Valparaiso," "Cuzco, America's Ancient Mecca," "In French Lorraine," etc.

ON a forested hill overlooking Rio de Janeiro, not far from the eighteenth century stone aqueduct which brings cool mountain water from Tijuca, lives an old man of Belgian blood who has earned a living since boyhood by catching butterflies. I found the old fellow in the dingy little workshop where he sorts, stretches, and dries his treasures, mounting them in pasteboard boxes lined with pith, to which they can be securely pinned. He has become feeble, and nowadays the boys in the neighborhood do most of the netting for him. Once he reached too far for a big golden beauty, fell off a cliff, and lay two days and nights in the jungle before he was found.

"I am nearly eighty," he told me, "and have lived on this hill since I was a boy. Ever since I can remember I have caught moths and butterflies. Before the war most of my shipments were to Belgium; but now I sell to curio dealers in town and to tourists at the hotel on the hill.

"We have many varieties of butterflies in this part of the country, and this *morpho* is the finest of them all." He pointed to a gorgeous eight-inch, metallic blue insect tipped with brown. "It flies here mostly in March."

RIO IS AS VARIHUED AS A TROPIC BUTTERFLY

As multicolored and varied in beauty as the butterflies of the tropics is the metropolis of Brazil. When autumn leaves are falling in the "States," it is springtime in Rio de Janeiro. Then the treetops on the hills are all abloom in pink and purple, scarlet and gold.

In splendor of hue and setting, this great city of the South is unrivaled the world over. Here granite peak and turquoise sea, tropic forest and rainbow-tinted town, meet and harmonize.

This city of lure terraces up from a glorious bay—the Bay of Guanabara, mountain-encircled, isle-bejeweled. From the shore, where parks and boulevards are fast crowding out the old Rio of narrow streets, rise the forested hills on whose slopes the lovelier portion of the city lies.

Place your hands on the table, fingers spread, wrists upraised. Each finger represents one of Rio's hills; each space between, a canyon up which the city climbs.

A CITY OF COLORFUL GARDENS

Spain is the land of paintings, Portugal of gardens. In Brazil many things Portuguese have persisted besides the mother tongue. Colorful indeed are the gardens of Rio.

There are old walled gardens surrounding houses built in the days of the empire. These houses usually stand at the head of a canyon, or on the crest of a hill. They are dignified one-story buildings with large rooms, high ceilings, and many windows. Their vivid color is what the Brazilians call "Portuguese

Photograph from Harriet Chalmers Adams

VIEW OF A PORTION OF RIO DE JANEIRO'S WATERFRONT FROM THE ISLAND OF COBRAS, THE BRAZILIAN GOVERNMENT NAVAL BASE

The entrance to the harbor, a bit of the bay front, and the ancient Jesuit church on Castello Hill, built in the middle of the sixteenth century, are shown. From Castello Hill (Morro de Castello), with its earliest churches and fort, the city gradually expanded.

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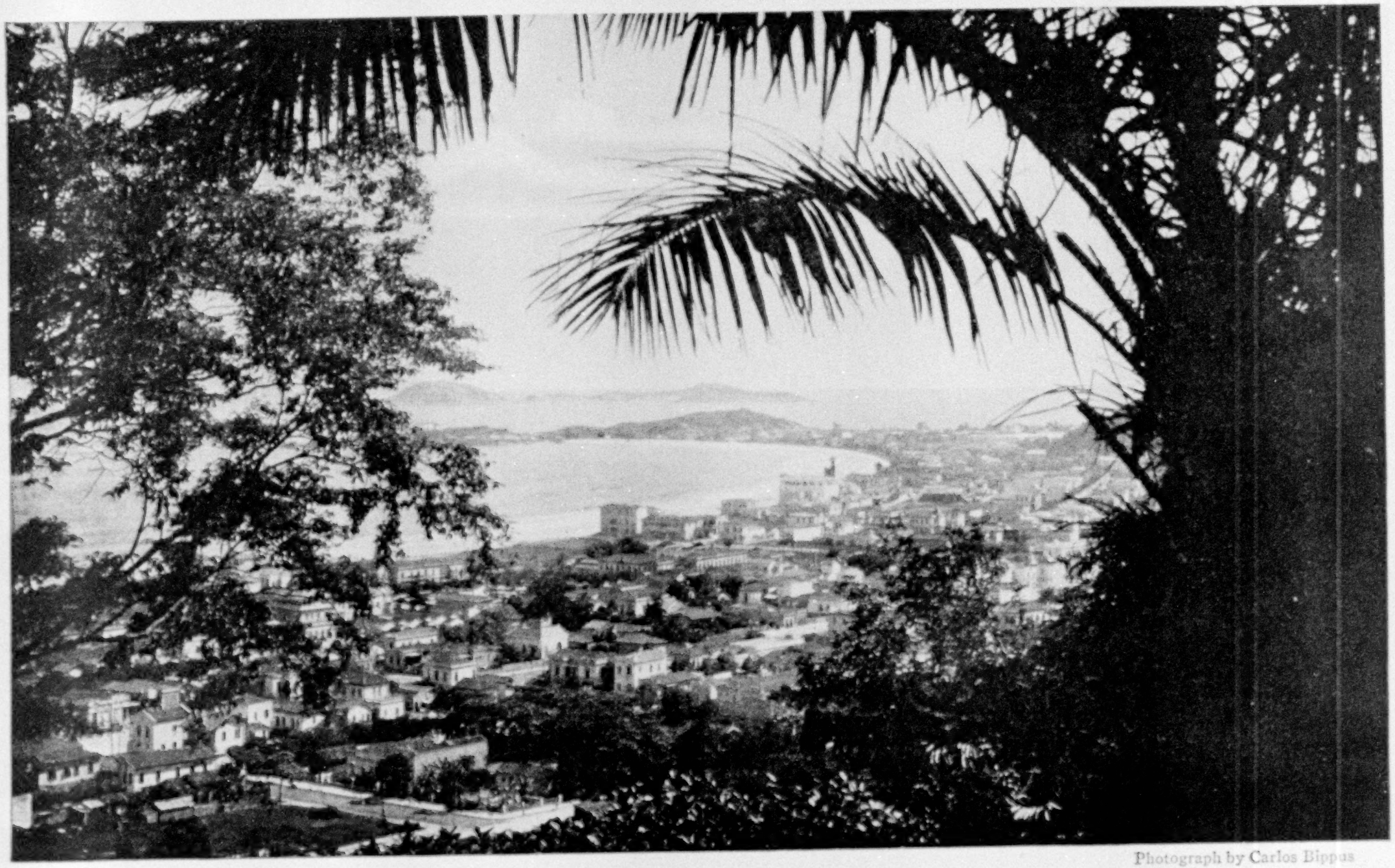
Photograph from Harriet Chalmers Adams

RIO DE JANEIRO FROM THE SUMMIT OF SUGAR LOAF (PÃO D'ASSUCAR), SHOWN ON PAGES 182 AND 183

The view back on the city at sunset from Sugar Loaf summit. All around is water. As the glowing, coppery sun drops behind the jagged mountain tops, dusk envelops the land in a mystic reddish haze. One by one the lights of the city gleam out, night falls, and Rio is a bejeweled goddess on a purple velvet throne.



Photograph by Carlos Bippus

ON THE OCEAN SIDE OF RIO, LOOKING DOWN ON ONE OF THE CHAIN OF BEACHES

There is a range of hills between these ocean beaches and the city. Tramway tunnels pierce these hills. The ocean avenue, the Atlantica, is by the sea, in front of all these ocean resorts. Many people live here all the year; others come for the summer. The Country Club is on the beach Ipanema, beyond. The surf here is treacherous, and on the bathing beaches there are life-boats offshore, as well as lookouts, expert swimmers, stationed in high posts.

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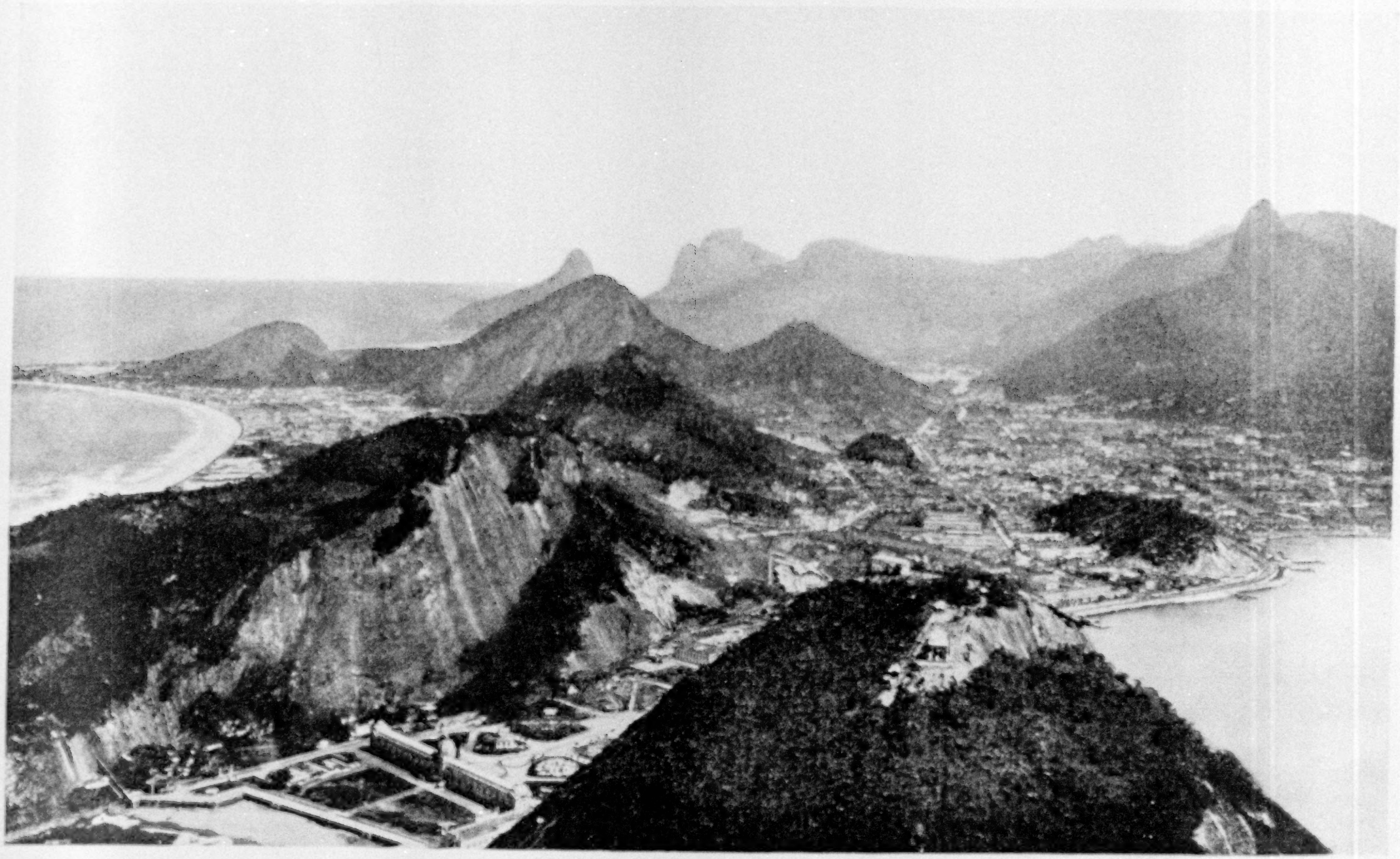


Photograph from Harriet Chalmers Adams

BOTAFOGO SHORE, BAY FRONT, TO THE RIGHT; SEA FRONT TO LEFT: RIO DE JANEIRO

This remarkable photograph shows both the bay and ocean shores of Rio, affording a clear idea of how the two beaches, bay and sea, are connected by tunnels through the hills. The photograph was made from Sugar Loaf. In the foreground is Urça, the hill or rock connected with Sugar Loaf by aërial ropeway. Nothing can be more striking than the effect of these huge rounded masses of naked rock rising out of the most luxuriant vegetation.

Photograph by Carlos Bippus

RIO DE JANEIRO FROM SANTA THEREZA HILL

Rio's loveliest suburb is in the forested mountains back of the city, a trolley ride of 25 minutes from Carioca Square down in the level part of town, near the bay front. The trolley follows the windings of the ancient Carioca aqueduct. In this forest the wild birds congregate, with their cheery whistling and limpid song. We are looking down on the crescent of Botafogo, one of the bay beaches of Rio, to the site of the exposition buildings, which are on Vermelha Beach; on Sugar Loaf, including Urça; the peninsula adjoining Sugar Loaf, on which one of the forts is situated; the narrow entrance to the bay, and the shore across the bay. All beyond Sugar Loaf is the ocean.

blue," crowned by the reddish brown of weather-beaten tiles.

In the gardens of these homes tower royal palms, great jaqueira trees heavy with fruit, wide-spreading mangos, and South Brazilian Paraná pines with straight betasseled branches. These noble trees, foreign to Rio's hills, tell us that the gardens were planted back in the first Dom Pedro's day, or perhaps in the time of his father, Dom João the Sixth.

RIO HONORS THE MOTHER OF BRAZIL'S BEAUTIFUL PALMS

In 1808 Portuguese royalty fled from Napoleonic despotism in Europe to set up its court in Brazil, and the following year the prince regent, afterward Dom João VI, imported the royal palm of the Antilles and planted it in the botanical gardens of Rio. Here the original palm still stands.

"Our Mother Palm was sick some years ago," a Brazilian told me, "and we were greatly alarmed lest she should die. From this single specimen have come all the wonderful palms which beautify our parks and avenues. We treated our royal patient with care, gave her a medicinal bath, and she recovered."

I went out to call on this historic tree. With all its one hundred and twelve feet of height, it does not look hardy. The director of the botanical gardens, however, assured me that it is now free from the ravages of insects and will live for many years. On the railing surrounding the palm is a plaque with this inscription:

> *Oreodoxa Oleraçea.*
>
> Planted by Dom João VI.
>
> The Palm Mother.
>
> Those of her species are cultivated in the country.

Near the palm is a bust of Dom João, whose forethought and love of gardens greatly enriched the flora of Brazil. During his reign, valuable Asiatic trees, such as the mango, jaqueira, breadfruit, and tamarind, and many of the Old World flowering trees which glorify Rio's hills, then came to Brazil through Portugal's far-flung colonies in Asia and Africa; or were brought from Cayenne, in French Guiana, then known as the Isle of France, where the French maintained a botanical garden from a very early period.

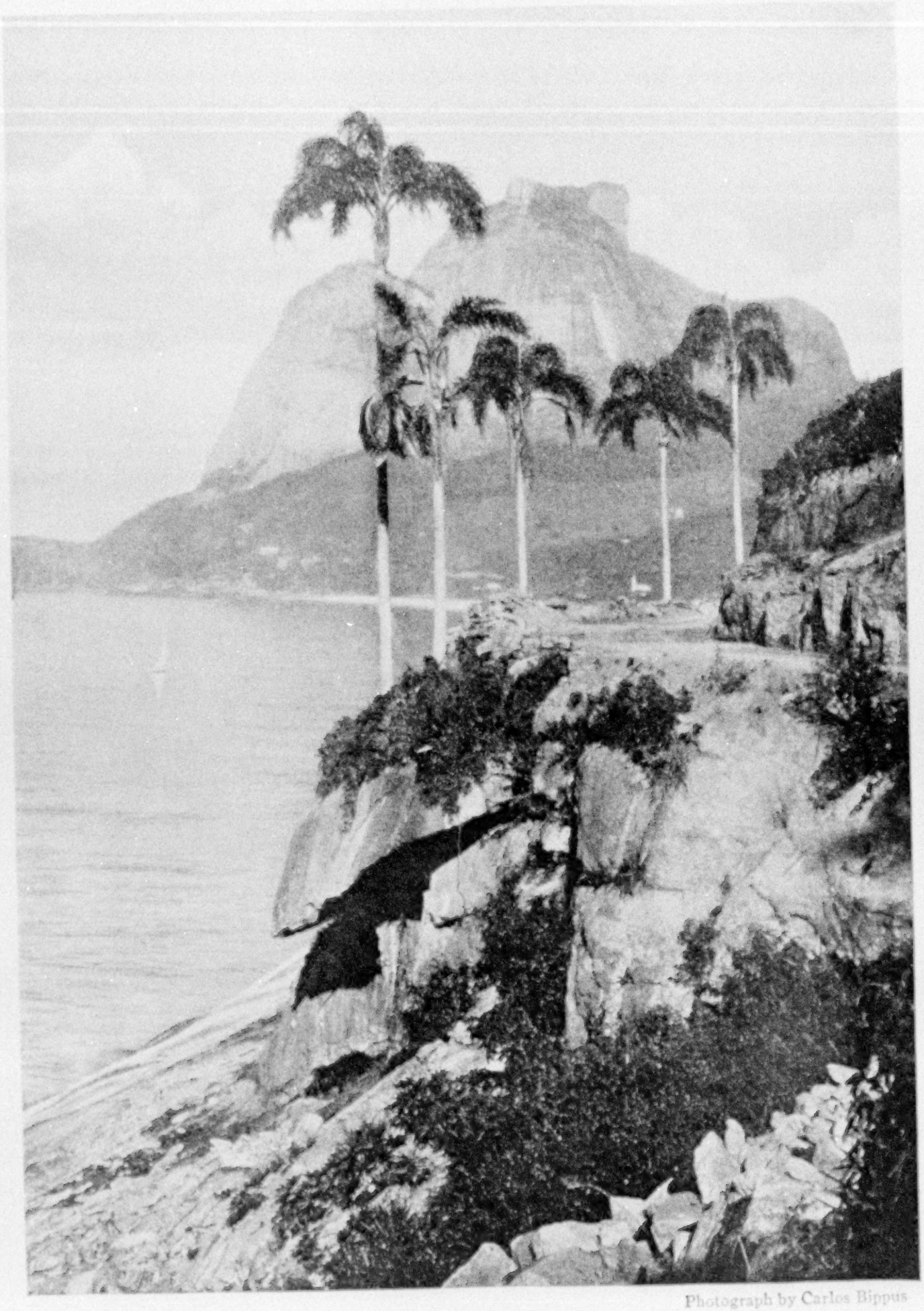
In the old gardens are other marks of bygone days besides the venerable trees. Here and there is a wall faced with blue and white Dutch tiles, which found their way to Brazil when Holland invaded its northern coast, in the seventeenth century. On some of the tall gate-posts stand big blue or yellow porcelain ornaments in the form of pineapples, imported from Portugal one hundred or more years ago. "They bring good luck to the household," an old servant told me.

Color runs riot. The purple bougainvillea here grows to be a tree; the flaming poinsettia becomes a giant bush. There is the glowing coral vine; the hibiscus in red and in rose; the violet and lavender manacá. Brilliant variegated crotons border the paths. Most conspicuous are the gorgeous flowering trees, such as the native cassia, or "golden shower," whose yellow clusters resemble the wistaria; the West Indian salmon and red frangipani of fragrant memory; and the flamboyant, or royal pointiana of Madagascar, the joy of the garden.

SOME OF THE CITY'S CLIFF DWELLINGS ARE ENTERED FROM THE ROOF

To me the modern architecture of the city houses is much too ornate. Rio de Janeiro is like a lovely woman, who needs little embellishment. Here buildings on simple lines are best. All the houses, however, have the redeeming quality of varied and vivid coloring, which, combined with terra-cotta earth and emerald foliage, forms one of the most attractive features of the city. While terra-cotta, in soil, roofs, and garden walls, is the predominating tone, almost every shade is represented in this iridescent town.

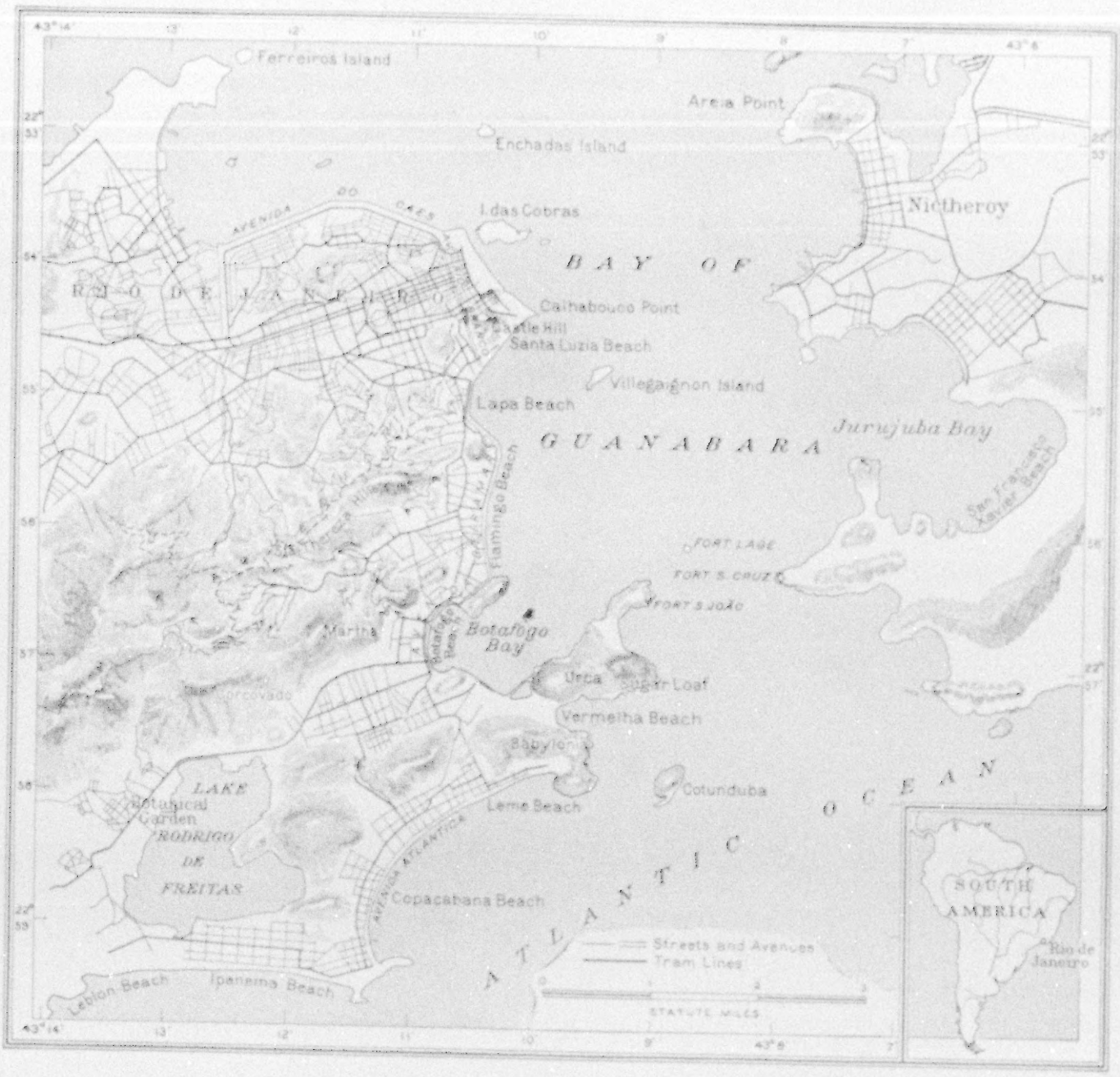
Many of the new homes cling to the hillside below the street and are entered from the roof. Others of these cliff-dwellings perch high above the thoroughfare and are reached by a long flight of steps or by elevator on an inclined plane. Some bear the name of the lady of the manor over the front door—"Villa Ro-



Photograph by Carlos Bippus

AVENIDA NIEMEYER, BY THE SEA, AND GAVEA ROCK

This avenue is a continuation of the Avenida Altantica and connects Leblon Beach with Gavea Beach. The Rock of Gavea (which means "The Sail") is the most beautiful in form of the many sentinel rocks which stand guard on Rio's shore and hinterland.



Drawn by A. H. Bumstead

A MAP OF RIO DE JANEIRO, ITS FAMOUS BAY AND SURROUNDING HILLS

sita," "Villa Lucia"—and the dark-eyed lady herself is often seen leaning from the window.

Although the women of the capital have now evolved to a much freer life than that of their provincial sisters, they are on the street less than Northern women and are, on the whole, greater home-lovers.

Butterflies and birds gladden every garden; but it is on Santa Thereza Hill that the forest birds congregate in greatest numbers. They wakened me early every morning with their cheery whistling and limpid song. The bird that plays star rôle all day long is the sabiá, beloved of Brazilian poets. They always have it perched high in the palm tree, but in reality it hides in the bush.

There are several varieties of the sabiá,—of the forest and of the shore—birds about the size of a robin. The woody-colored one with the orange breast, *Sabiá larangeira,* is the sweetest singer.

In variety of form and coloring the birds of Brazil, like the butterflies, outclass those of other parts of the world. Recently, in London, a Brazilian butterfly sold for $150.

STREET VENDERS CLAP THEIR HANDS TO ADVERTISE

Many and varied are the street venders, who sing their wares and clap their hands at the garden gate to attract attention. There are men who balance burdens on their heads and others who bear

Photograph by Harriet Chalmers Adams

FROM THE HEIGHTS NEAR CHINESE VIEW, WHICH MANY PEOPLE BELIEVE TO BE THE PLACE OF PLACES FOR "THE VIEW": RIO DE JANEIRO

From this vantage point one sees the ocean beaches and sea and the entrance to the bay rather than Rio. The "Chinese view," so called on account of the pagoda-shaped pavilion on the mountain where the visitor takes his stand, is a scenic crescendo of mountain peak and shore framed by the riotous foliage of a tropic forest.

weights on their shoulders, the former being more in evidence.

The custom among the working classes of bearing burdens on the head is a survival of slavery days. Everything is carried in this fashion, from a tin pan to a piano. It takes four men to carry a piano; but one man alone balances the gigantic bread-basket, weighing close to ninety pounds, toiling with it up the steep paths, one hand steadying the basket, the other grasping a camp-stool. I thought the camp-stool was for the man to rest on; but no! it is for the Honorable Bread-basket!

There are more than fifteen hundred of these bread men, each exhibiting the number of his license on the basket or attached to the formidable leather purse, resembling a woman's ordinary handbag, which the Rio street vender invariably wears on his hip, suspended from his shoulder by a long strap. Other characteristic features are the *tamancos*, or heelless wooden slippers, whose rhythmic "clap-clap" is heard in every part of the city, and the circular wad of cloth, once white, worn on the head as a cushion for the burden.

Every vender has his particular call. The tin-pan merchant thumps his wares with a big spoon; the Syrian who sells Ceará lace beats his basket with his yardstick; the strange minor wail of the peanut-seller takes you back to the Orient. There is, in fact, quite an Oriental touch to the city.

THE SACRED OX OF INDIA IS RIO'S BEAST OF BURDEN

When I was a child in California, the Chinese coolie, who sold us vegetables and gave me "China lilies" and dried litchi "nuts," came to the kitchen door every morning carrying six circular baskets suspended in groups of three on the ends of a pole slung across his shoulders. In just this manner the vegetable and chicken sellers of Rio carry their wares. It is, I believe, a survival among those customs which reached Portugal through her Far Eastern colonies.

A more tangible evidence of this influence is seen in the fawn or cream-colored zebu, sacred ox of India, used as a beast of burden on the hills of the Brazilian capital. Here, as in Portugal, oxen are yoked by the shoulders instead of by the horns, as in Spanish lands.

On the level streets of the city, mingling with countless head-bearers, are carters trudging beside their mule teams, men trundling hand-trucks, and cake-sellers with wares in boxes on wheels. These last named are popular, as the Brazilians are very fond of sweets. A unique sight is a cart with two huge wheels, carrying granite blocks or great logs suspended by chains from the axle.

HISTORIC INTEREST IS AT HAND

"Yes, Rio has many picturesque types," an American resident admitted, "but it is so utterly devoid of historic interest."

To this I cannot agree. History is there for those who search.

The first great name that flares up is that of Pedro Alvares Cabral, the intrepid Portuguese navigator, who in 1500, started out to follow the course of the Phœnicians around Africa, as described by Herodotus, and drifted West to Brazil instead.

In the Portuguese library in Rio hangs a painting depicting that memorable Easter Sunday when Cabral first sighted the shores of a new country, dimly visible on the far horizon. He leans on the caravel's rail peering out over the waters—a tall, swarthy, bearded man, clad in the doublet, knee-breeches, and long hose of the period. Behind him stand two sailors, on whose faces joy and awe are mingled. It was in a little port south of Bahia that the thirteen ships of the fleet cast anchor and on its shore the first mass in Brazil was celebrated.

In the National Library I saw the original letter sent to the King of Portugal by a certain Pedro Vaz de Caminha, announcing Cabral's discovery. Where Gloria Park meets the splendid Beira Mar Drive, skirting the bay, stands the imposing monument erected to the memory of Cabral three centuries after the discovery. In the cathedral, in a vault to the right of the high altar, are the remains of the great navigator, brought from Portugal in 1903 and here reverently interred. Just so the remains of Christopher Columbus were long ago

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Photograph from Harriet Chalmers Adams

COPACABANA, ONE OF THE ATLANTIC BEACHES, A SUBURB OF RIO DE JANEIRO

The lofty peak is Sugar Loaf (Pão d'Assucar), which guards the entrance to the bay. There are three other ocean beaches adjoining Copacabana. Paralleling the Avenida Atlantica, which connects the ocean beaches, is a wide black-and-white mosaic pavement in most approved Lisbon fashion.

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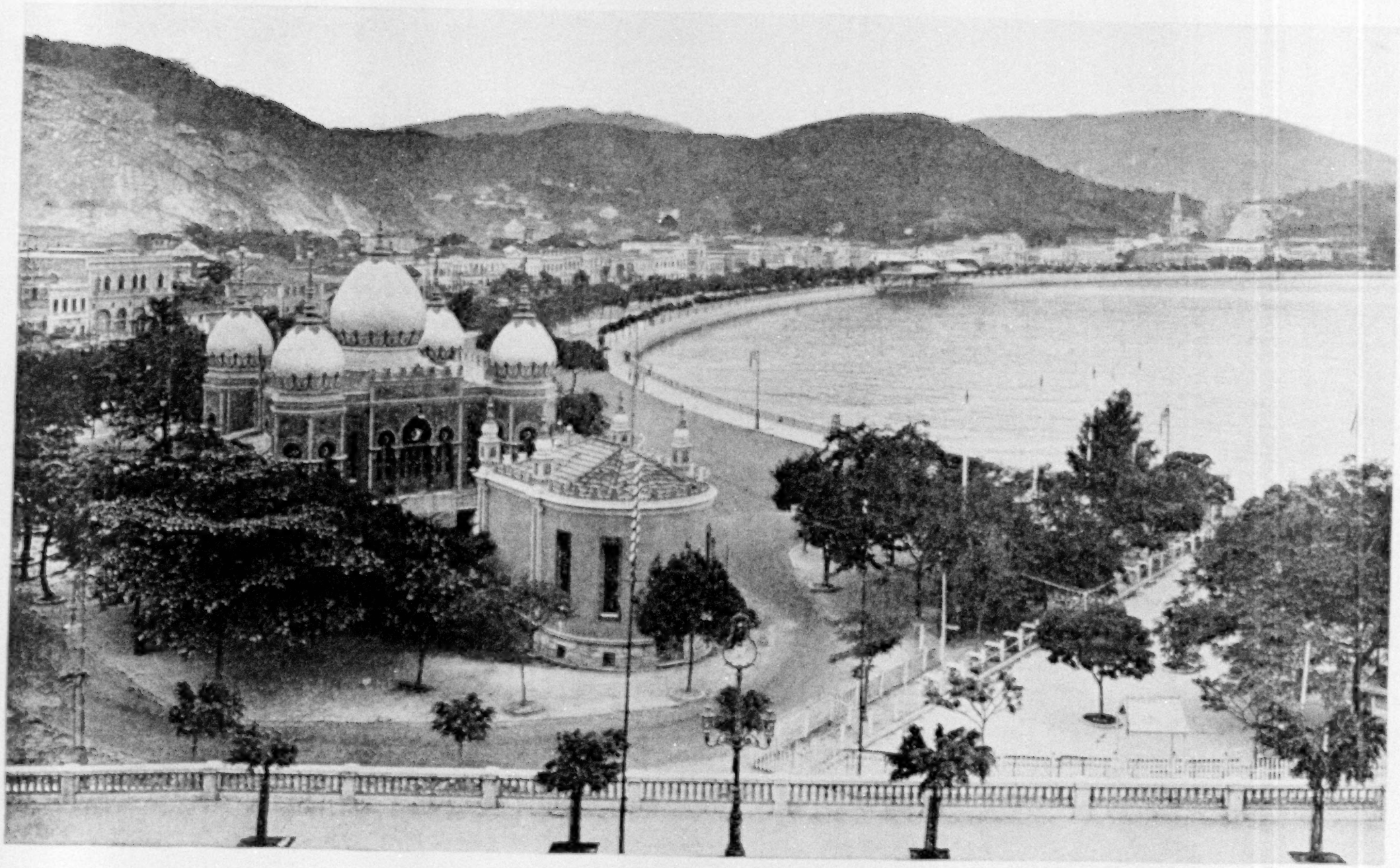
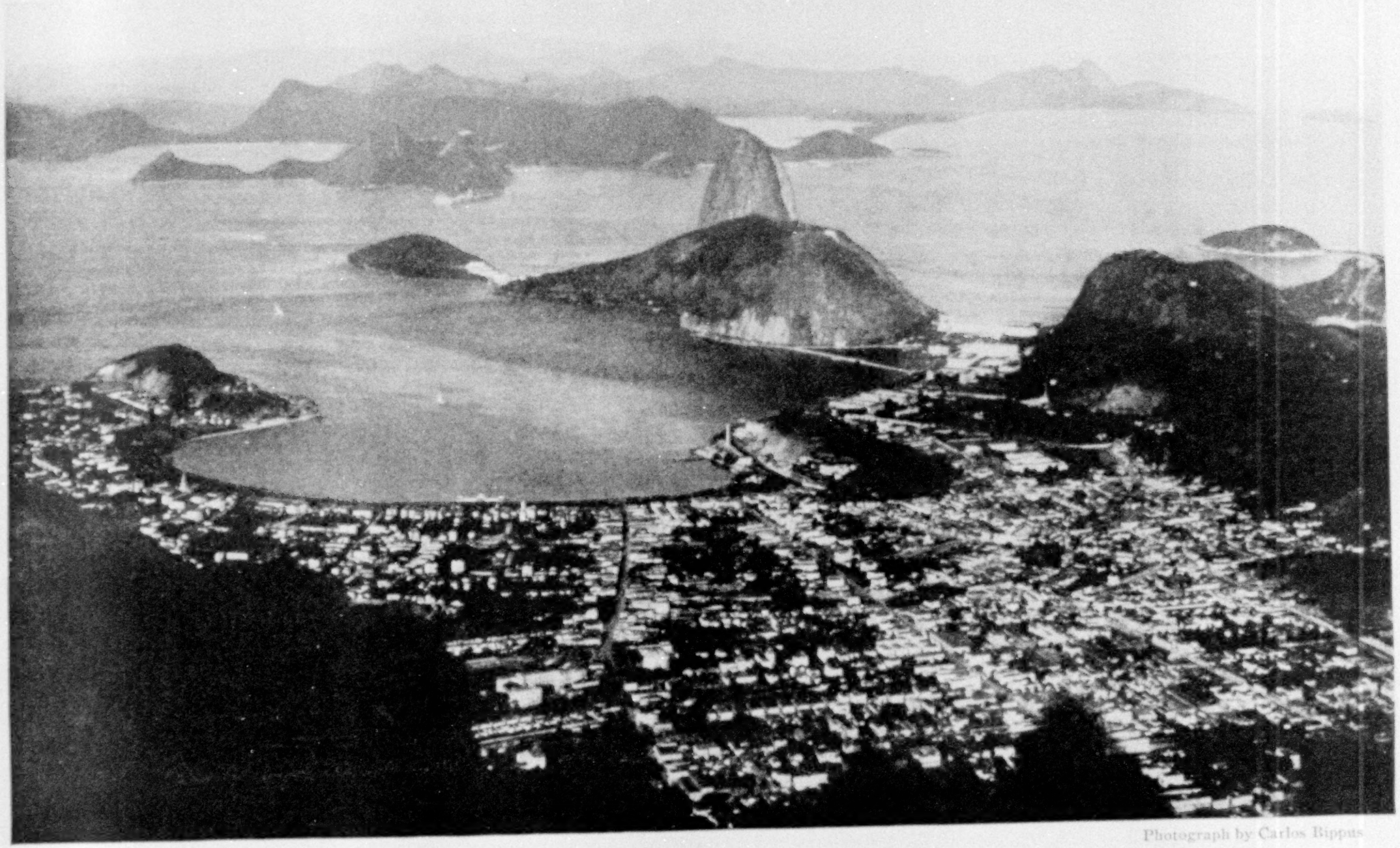


Photograph from Harriet Chalmers Adams

MORISCO RESTAURANT OR PAVILION ON BEIRA MAR DRIVE: RIO DE JANEIRO

There are several of these cafés along the bay and sea shores. People come for afternoon tea and supper. This is the Botafogo shore, bay front.



Photograph by Carlos Bippus

LOOKING DOWN ON THE CRESCENT OF BOTAFOGO: RIO DE JANEIRO

The little boats in the bay are native "faluas." The white speck near the entrance to the harbor is a rock with a fort (Fort Lage). The fort on the other side of the entrance is Santa Cruz and the one on this side is Fort São João.

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Photograph by Carlos Bippus

BOTAFOGO AT NIGHT

Sugar Loaf and the entrance to the bay, with Fort São João on the rock adjoining Sugar Loaf and Fort Santa Cruz on the opposite point, are distinguishable. It is a nautical mile between these two forts at the entrance to the bay. This is a night view of the scene shown on the preceding page. The electricity, generated by water-power, comes from the mountains, 51 miles away.

Photograph by Carlos Bippus

CRESCENT OF BOTAFOGO, LATE AFTERNOON EFFECT: RIO DE JANEIRO

There has been some talk about filling in the bay of the Botafogo crescent to win more land space and because some believe there is not sufficient tide here to flush the inlet, which is a little bay within the bay, as it were. It would be a great pity, as this is one of the most beautiful parts of the shore. The Beira Mar ("By the Sea") Drive skirts this shore and others of the bay side of the city, connecting through a tunnel with the Avenida Atlantica, the ocean boulevard. In early colonial days Botafogo, a fashionable residential suburb, was some distance from the city, but the city grew to embrace it and to extend far beyond this crescent bay.

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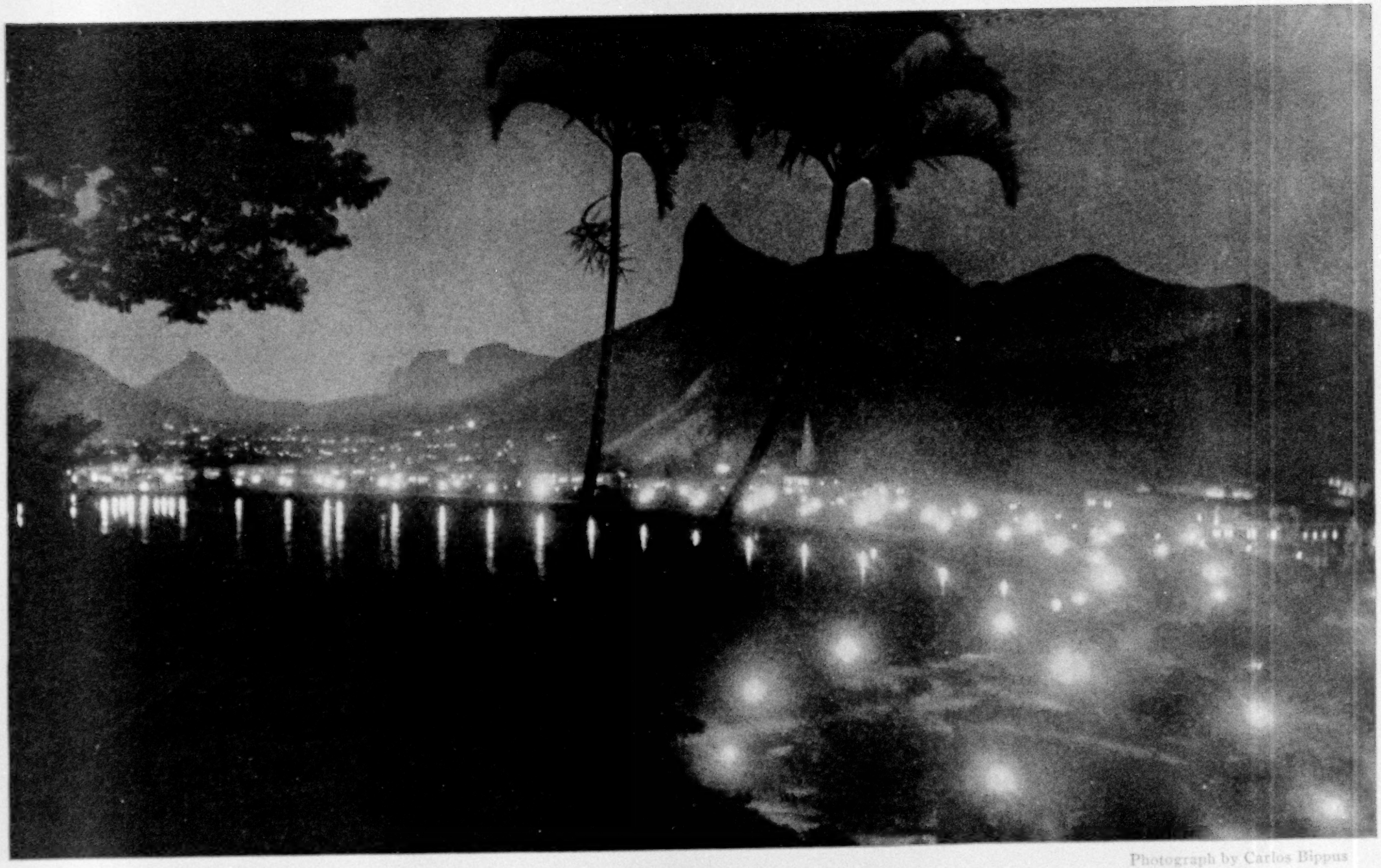
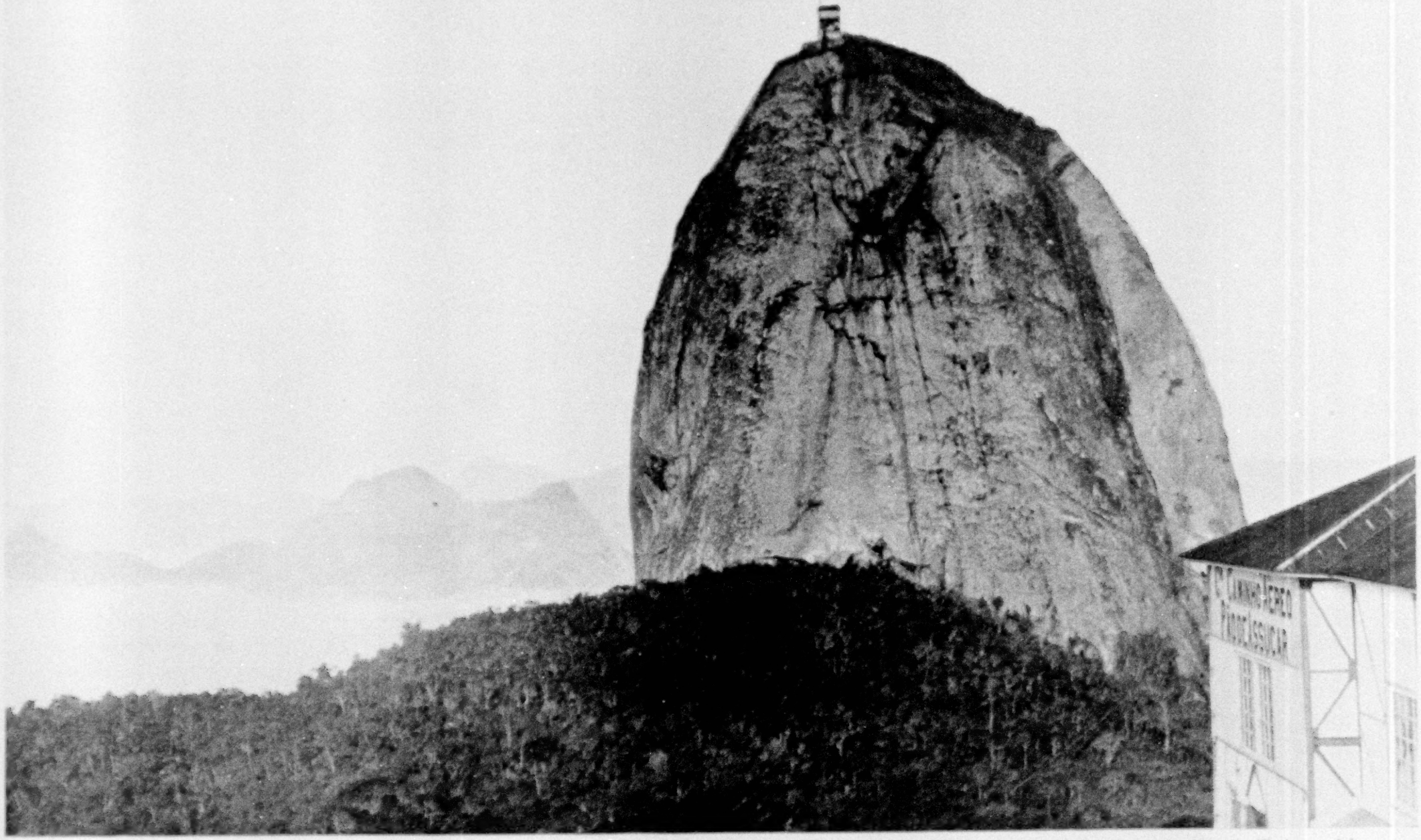


Photograph by Carlos Bippus

THE CRESCENT OF BOTAFOGO ILLUMINATED: RIO DE JANEIRO

These crescent shores are beautiful, and this crescentic form of shore is seen all along the bay and ocean side of the city. Since we count the ocean beaches as a part of Greater Rio, the city can be said to face both bay and sea.



Photograph by Harriet Chalmers Adams

SUGAR LOAF, THE GRANITE ROCK WHICH STANDS GUARD AT THE ENTRANCE TO THE BAY OF GUANABARA

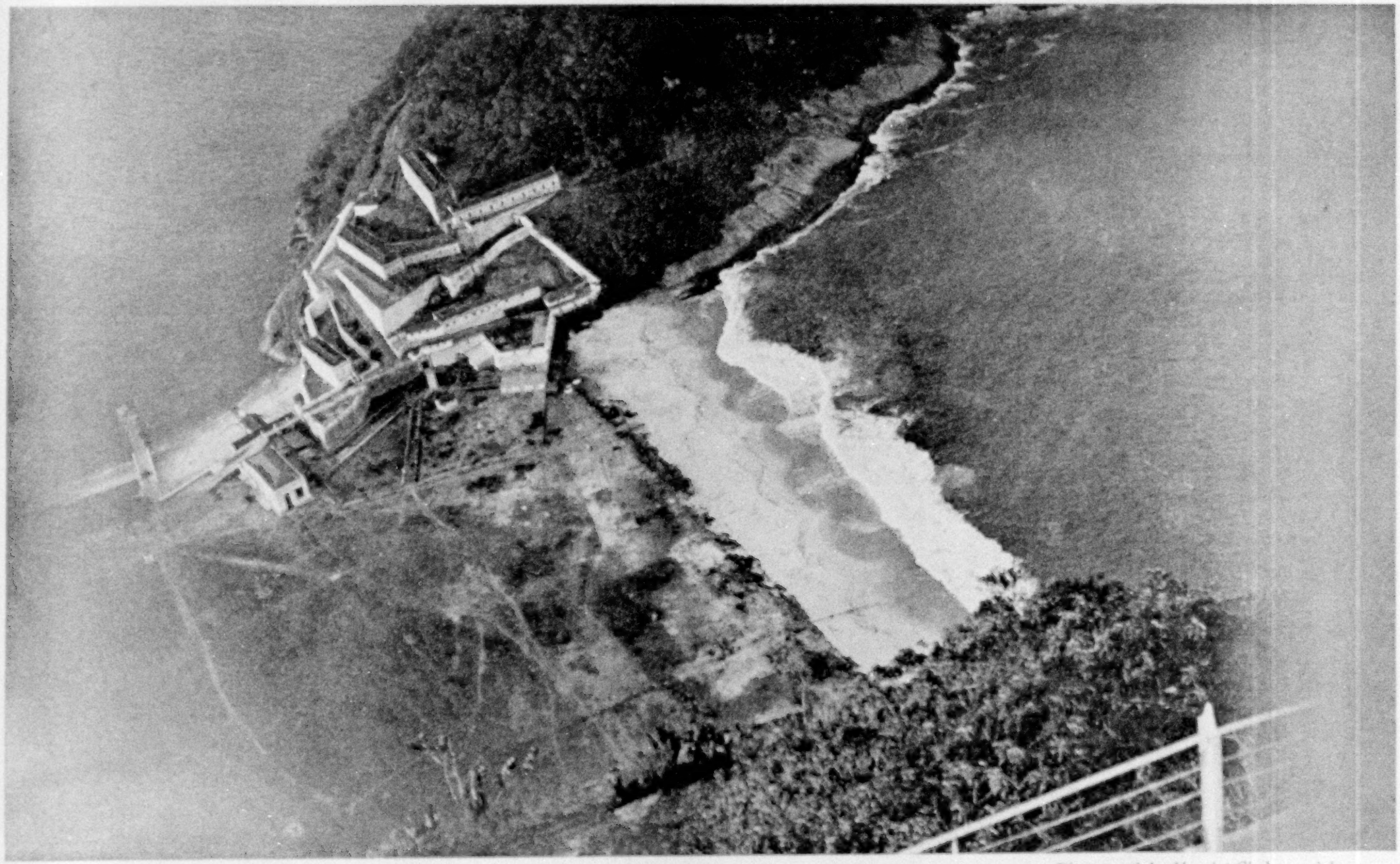
The early settlers called it the Dog's Face. The forest in the foreground lies between Sugar Loaf and a rock nearer the Rio shore, called Urça. The summit of Urça is reached in one flight by aerial ropeway (car suspended on a cable). A second and longer flight on a steep incline is made over the forest to the summit of Sugar Loaf, where there is a view in every direction, looking back on Rio and its mountain hinterland; the bay, with its many islands; the town of Nictheroy (gleaming white in the distance), across the bay from Rio, and the Atlantic Ocean, outside the harbor, with its lovely beaches—an incomparable view.

XUM

Photograph from Harriet Chalmers Adams

A BRAZILIAN ENGINEER CONCEIVED THE IDEA OF THIS AËRIAL ROPEWAY TO SUGAR LOAF, THE 1,383-FOOT SENTINEL OF RIO BAY

The peak had been scaled by a British middy, who raised the Union Jack, and by a girl from the United States, who unfurled the Stars and Stripes. The car accommodates twenty passengers. The counterweight of each cable is thirty tons, and the fixed cables offer a resistance of 150 tons each. Some people are timid about making this aërial trip. It is like sailing in a balloon (see text, page 210).



Photograph by Harriet Chalmers Adams

AN AËRIAL VIEW OF THE BEACH SITE ON WHICH THE FIRST SETTLEMENT WAS MADE BY ESTACIO DE SÁ, FOUNDER OF RIO

This photograph was taken while sailing up to Sugar Loaf on the aërial ropeway. Estacio de Sá was brought back here to die, after he was wounded on one of the islands in a battle with the Indians (see text, page 185). The building below is one of the forts guarding the entrance to the harbor. To the right is the sea; to the left the bay of Rio.

brought from Spain to the cathedral in Santo Domingo.

THE CITY FOUNDED IN 1565

The first name which stamps itself directly on the history of Rio de Janeiro is that of Estacio de Sá, who founded the city in 1565, although earlier explorers cast anchor in the bay, known to the native Tamoyo Indians as Guanabara—"arm of the ocean."

Historians disagree as to who first entered this marvelously beautiful land-locked haven, Nature's masterpiece in harbors, where gigantic sentinel rocks stand guard at the narrows and mist-crowned mountains of surpassing grandeur dip their jungle-clad feet in the sea. Perhaps Amerigo Vespucci was here in 1502; Gonçalo Coelho, Chief of the Portuguese Navy, may have arrived the same year. Some credit João Dias de Soles with having discovered the harbor in 1515. Certain at least we are that Fernando de Magalhães, whom we call Magellan, spent a fortnight here in 1519, on his way round the world, naming the bay Santa Luzia.

Next came Martim Affonso de Souza in 1531, on his way south to found São* Vicente, near the present site of Santos. He thought the bay the mouth of a great river and called it Rio de Janeiro, River of January. Today the Brazilians of the capital call themselves Fluminense, or river folk.

THE FIRST PROTESTANT SERVICE IN THE NEW WORLD HELD NEAR RIO DE JANEIRO

In 1555 an adventurous Frenchman, Nicolas Durand de Villegaignon, Knight of Malta, arrived with a band of Huguenots, and on an island near the entrance to the bay, still called Villegaignon, was held the first Protestant service in the New World, sixty-five years before the Pilgrim Fathers landed at Plymouth Rock.

It was with the intention of expelling for all time these French colonists that Mem de Sá, Portuguese Governor at Bahia, sent his nephew, Estacio de Sá, with a body of soldiers to found a settlement on Guanabara Bay.

We can picture that primitive village—a crude chapel, a few thatched huts on the little peninsula which lies at the base of the great rock known as Pão d'Assucar, or Sugar Loaf. One shore of the peninsula faces the sea; the other looks out on the bay. The village was called São Sebastião in honor of the Portuguese king, a name that clung to the city well into the nineteenth century. From it Estacio de Sá went forth in 1567 for a final and victorious battle with the French and their Indian allies, but in the struggle he was mortally wounded.

There is an impressive painting depicting the death of de Sá. They had brought him back to the village on the beach, and there, in the shadow of those mighty mountains he had grown to love, which were one day to look down on a great, glittering city, Rio's founder died and was laid to rest in the humble chapel.

HISTORIC CHURCH DOOMED

The settlement was then moved up the bay to the summit of a hill called Morro de Castello, or Castle Hill. Here, in the church of São Sebastião, Rio's oldest edifice, begun in 1567, completed in 1583, and thrice since remodeled, I stood by the tomb of Estacio de Sá. It is marked by a rough stone slab laid in the floor before the altar—stone hewn from the granite hills which encircle the city. In quaint old Portuguese I read:

"Here lies Estacio de Sá, Captain and Conqueror of this land and city. This site was built by the order of Salvador Corrêa de Sá, his cousin, second Captain and Governor, with his arms. This chapel was completed in the year 1583."

The bearded Capuchin monk who showed me about nodded his head in the affirmative when I asked if he thought the hill would be leveled in time for the ever-growing city.

"I fear they will eventually tear down the old church," he said sadly, "and move de Sá's tomb to the cathedral."

"Regular Apaches live on Castle Hill," an American physician told me. "They are a law unto themselves, obey no sani-

*The word "São," corresponding with the Spanish "San," means "Saint." The Portuguese language, which has been called "the eldest child of Latin," is more masculine and less musical than the Castilian. It is rich in *s*'s and *h*'s. "The Portuguese," once said my fellow-trailer, "have picked up all the *h*'s the Cockney English have dropped."

Photograph from Harriet Chalmers Adams

MANGUE CANAL AND AVENUE WITH THE QUADRUPLE ROWS OF ROYAL PALMS; RIO DE JANEIRO

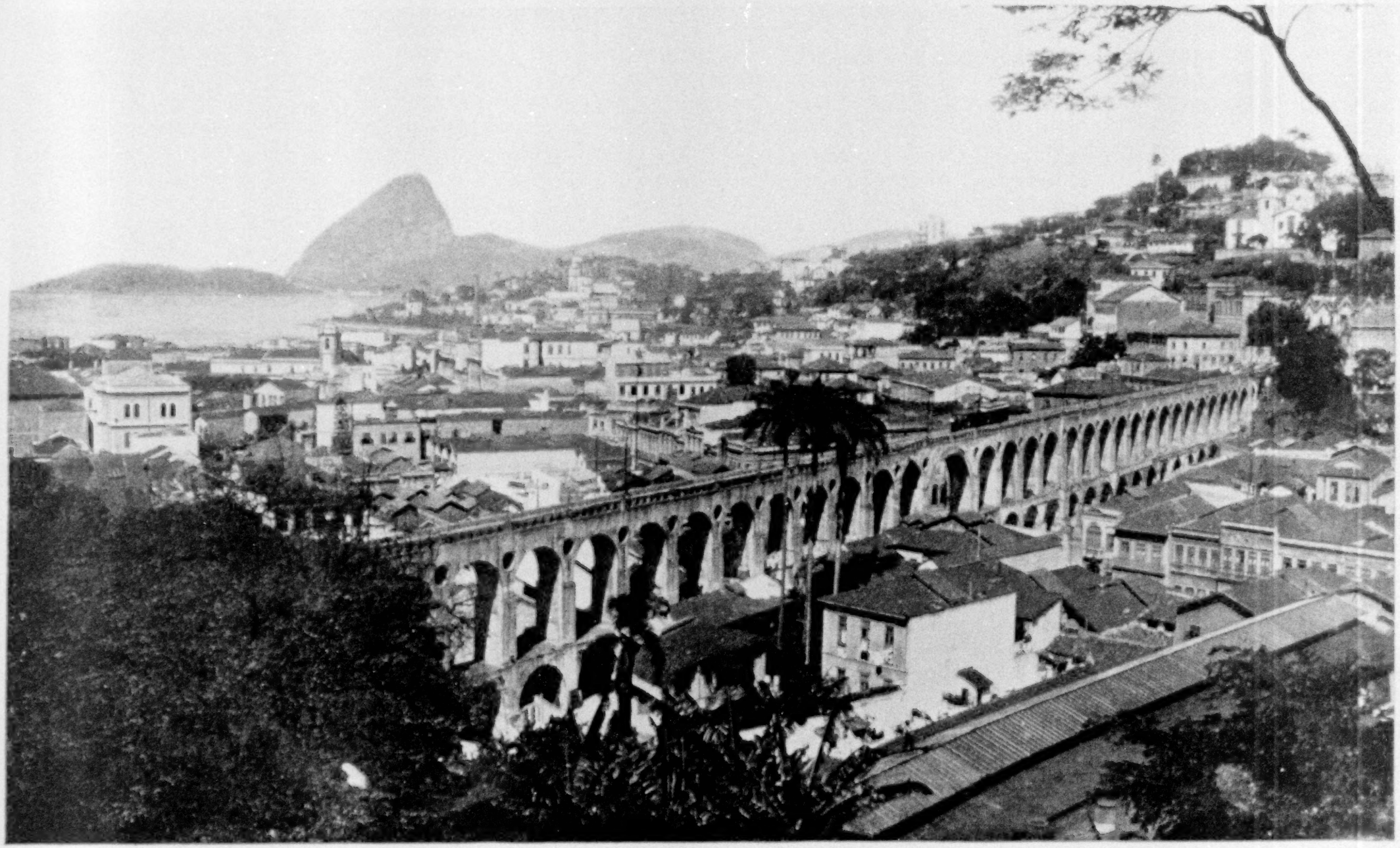
The canal was constructed long ago, to drain an unsanitary portion of old Rio. This is the finest palm avenue in existence. At the end of the avenue near the bay, where new land has been reclaimed recently, the city has planted new trees, which in time will rank with their elders. The Quinta Bôa Vista (see text, page 195) is in this part of the town, which in the days of Dom Pedro I was the country.

XUM

Photograph by A. Ribeiro

PRAÇA MARECHAL FLORIANO: RIO DE JANEIRO

Here the Avenida Rio Branco begins and here connects with the Beira Mar Drive. The Municipal Theater is seen to the left; Bellas Artes and one end of the National Library to the right; statues at the base of the pedestal (four of them) depict the Indians being instructed by a priest who came with de Sá and the redemption of the African slaves. Marshal (marechal in Portuguese) Floriano Peixoto succeeded Dedoro de Fonseca (the first President) in 1891. Note the paved mosaic sidewalk.



Photograph from Harriet Chalmers Adams

CARIOCA AQUEDUCT: RIO DE JANEIRO

Going up by trolley from the waterfront to the mountain suburb of Santa Thereza, we cross the old aqueduct (now a viaduct) and follow the Rua do Aqueducto to Sylvestre. The aqueduct was built in colonial days, eighteenth century, to bring mountain water from Tijuca Mountain to the city, and is still partially intact. The hill to the right is Curvello, and on the left the viaduct reaches São Antonio Hill, on which a famous old monastery of the same name is situated.

XUM

Photograph by Franklin Adams

AN OLD STONE SEAT AT THE HEAD OR UPPER REACHES OF THE CARIOCA AQUEDUCT: RIO DE JANEIRO

The source of the water which flows through this ancient aqueduct is high above, on Tijuca Mountain, back of the city. The aqueduct was built by the Count of Bobadella, an early governor of the colony, and was for long years the city's main carrier of pure mountain water. The author is seen resting after the climb up the steep hill to Sylvestre.

Photograph from Harriet Chalmers Adams

AVENIDA RIO BRANCO, FORMERLY AVENIDA CENTRAL

This magnificent thoroughfare is named for Baron Rio Branco, a great Brazilian diplomatist, now dead. It was carved out of the city during the administration of President Alves. This portion of the city has been cooler ever since, as the breezes sweep through the wide avenue from waterfront to waterfront. Note the wide mosaic stone pavements (black and white). Portuguese workmen from Lisbon were brought over for this work, an ancient craft in Portugal, introduced into that country by the Romans.

tary regulations, and are the despair of the Department of Hygiene. Too bad to tear down the old church, but better for public health if all these hills by the waterfront were leveled." I marveled that just at the foot of this hill lies a business thoroughfare which compares favorably with Fifth Avenue.

The next name on our roll of honor is that of Gomes Freire de Andrade, Count of Bobadella, who, as governor of the colony from 1733 to 1763, introduced the first printing-press and completed the famous Carioca aqueduct. He was instrumental in moving the capital here from Bahia, although he died shortly before the realization of his dream.

Carioca, pronounced "Kar-e-awk'-ah," is an Indian word meaning "a descendant of the whites," in contrast with mixtures between Indians, Africans, and Europeans. Thus the "Cariocas" represent Rio's aristocracy.

I love the old Carioca aqueduct, long the city's main source of mountain water, with its lichen-covered gray arches winding up the hill to Sylvestre, on the slopes of Corcovado. I grieve that it is being destroyed in part to widen the road for motorists. To its upper reaches I have followed, along the side of the mountain, where the great feathery paineiras trees grow, to its very beginning, high up in Fern Land.

A CITY OF ENTRANCING VISTAS

Can any other city offer such entrancing vistas as those from the mountain heights back of Rio? I have traveled far and have yet to find it. Turning bayward, we look down, through a frame of tangled vines and branches, on to the tree-tops of the sloping virgin forest. A scarlet-winged bird flits to a near-by tree-fern; a big blue butterfly zigzags lazily by. There are purple orchids within reach and waxen begonias at our feet. Far below, set in verdure, gleams the kaleidoscopic city, with its crescent shores.

The beaches have such euphonious names—Formosa, Santa Luzia, Lapa, Gloria, Flamingo, Botafogo, Vermelha! The bay, set in its amphitheater of hills, sparkles like a sapphire. To and fro among the ships at anchor ply the busy paddle-wheel ferry-boats to the islands and to Nictheroy, the little sister city across the way. In the distance tower the blue spires of the lofty Organ Mountains. Today we can see the sharp crag called "The Finger of God." Often it is veiled in mist.

WHERE BRAZIL'S FIRST MARTYR WAS EXECUTED

Oceanward we look down on titanic granite mountains rising sheer from the sea. There is bulky Babylonia, and flat-topped Gavea, like a great sail unfurled. Between them lie Rio's suburban beaches—Leme, Copacabana, Ipanema, Leblon—in a glistening chain, their white villas nestling between hill and shore. The Avenida Atlantica, which connects them, is equaled only by boulevards along the Mediterranean.

We can motor from the city to these beaches and on to Gavea over a new road cut in the rock high above the sea, climb to the divide at Tijuca, and drop down, on the bay side of the range, to our starting place in the city—a wonder circuit of forty miles or more.

Returning to the city through Rua Conde de Bomfim, we pass the little park known as Praça Tiradentes, where, in 1792, the first martyr of Brazilian liberty, Sublieutenant Joaquin José da Silva Xavier, nicknamed "Tiradentes," or Tooth-Puller, was executed. Some say he was beheaded; others that he was drawn and quartered. It was in the neighboring State of Minas Geraes that this young officer, inspired by the success of the American Revolution, headed a band of patriots bent on throwing off the Portuguese yoke.

Tiradentes was tried and sentenced to death; his companions were exiled to Portuguese Africa; yet in 1922, when Brazil celebrates her centenary of independence, these brave men will be featured in the splendid historical pageant even now being staged.

ARRIVAL OF PORTUGUESE ROYALTY INAUGURATED NEW ERA

Brazil swung into a new cycle in 1808, when Portuguese royalty arrived from Lisbon to set up its court in Rio de Janeiro. Dom João and his mother came

Photograph by Harriet Chalmers Adams

THE AVENIDA RIO BRANCO, RIO'S FINEST THOROUGHFARE

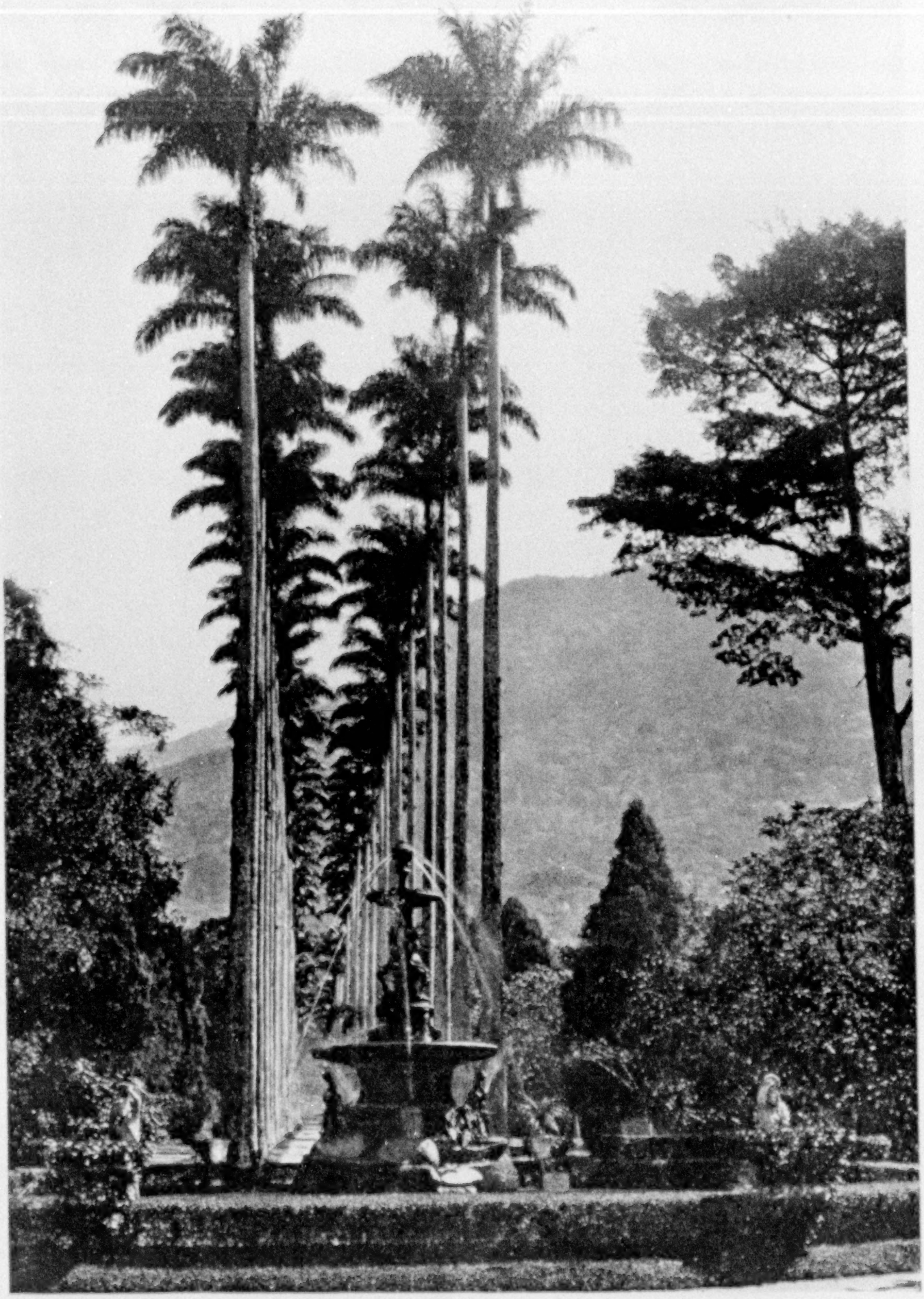
This avenue is more than a mile in length and so wide that it consists of two distinct boulevards. These are separated by a row of shade trees. This avenue, begun in 1904, was completed in six months.

XUM

Photograph from Harriet Chalmers Adams

A STREET LEVEL VIEW OF THE FAMOUS AVENIDA RIO BRANCO

Motorists here keep to the right, as in the United States, instead of the left, as in Buenos Aires, and if pedestrians do not do likewise they are politely instructed by a policeman. The building with the tall tower houses one of the city's leading daily papers.



Photograph from Harriet Chalmers Adams

THE ROYAL PALM, NOBLEST OF TREES, GRACES MANY A PARK AND AVENUE OF THE BRAZILIAN METROPOLIS

This palm is not native to Brazil, having been brought from the Antilles by Dom João VI in 1808. The original "Mother Palm" may still be seen in the Botanical Gardens of Rio. The palms are taller and finer here than on their native heath (see text, pages 171 and 195).

ashore in the royal barge, still preserved at one of the island naval bases. This same barge, used on two other occasions only, was sent out to meet Elihu Root on his famous South American tour.

I have a map of Rio, printed in 1808, showing the city that Dom João found. It was a maze of narrow, uneven streets and narrower alleys, lighted at night by tallow lanterns hung out by public-spirited citizens. It was rich, however, in churches and convents, hospitals, barracks, a theater, and nineteen public squares. The king made a royal palace of the handsome building, now the National Telegraph Office, which had been occupied by the colonial governors, and from here his successors, the Pedros, ruled after him.

Dom João's portrait shows a portly gentleman with pompadour and "side burns." He was a patron of arts and letters and brought with him from Portugal the royal library of 60,000 volumes and the "old masters" which now grace the Academy of Bellas Artes. The national library is one of his lasting memorials, alone worth a visit to Brazil.

MANY TREASURES IN BRAZIL'S NATIONAL LIBRARY

I wish I had space to outline all the treasures I found here. There are 5,000 maps, 400,000 catalogued volumes, and 500,000 manuscripts. I saw a Latin manuscript, in microscopic writing, of the year 1300; the Mazarin Bible of 1462, the first Bible printed from movable type; a first (1572) edition of Camões' "Lusiadas," that epic of Portuguese navigation; a first edition of Hakluyt's Voyages, 1625, and countless other interesting books.

The library has a modern book-carrier, with which few institutions of the kind are equipped, and fumigates all its books—a practice which could well be followed the world over. Here it serves the double purpose of sanitation and the destruction of boring insects.

Dom João's botanical garden is today the finest in the New World and equaled only by that of Buitenzorg, Java. Its century-old imported bamboos are as tall as forest trees; its native Victoria Regia lilies most queenly of their kind. Its Royal Palm Avenue, almost eighteen hundred feet long, is second only to Rio's Quadruple Palm Avenue bordering the Mangue Canal.

THE STORY OF THE PALMS AS TOLD IN RIO

In the early days these palms were a mark of royal distinction and were planted only in parks and avenues near city and country palaces. The story goes that a slave stole some of the seeds and sold them. Today these "feather-dusters of the gods" wave in every part of the city. At present there is a free distribution of seeds and plants from the botanical garden.

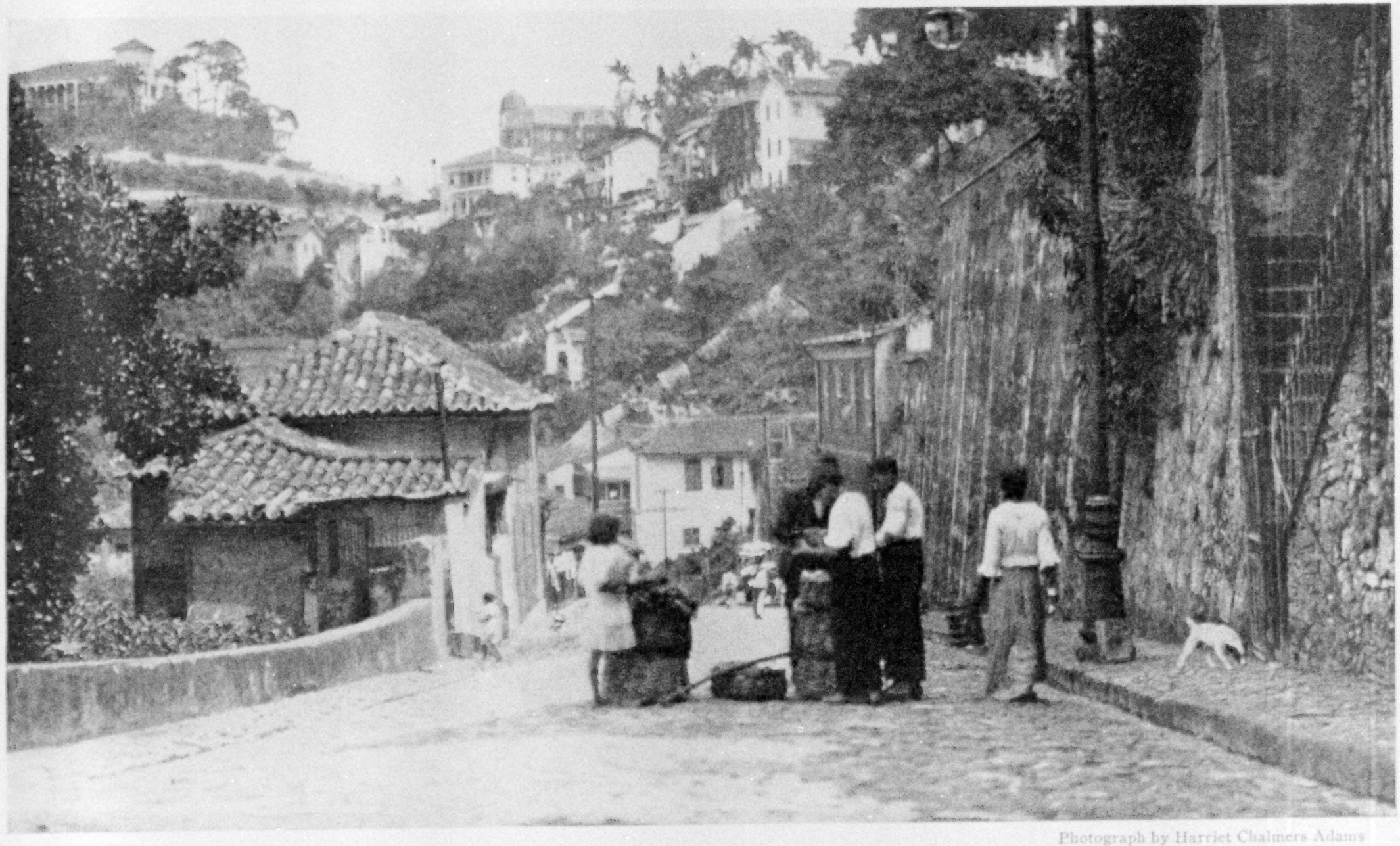
I like best the great trees from the Brazilian wilderness — the jacarandá, sapucaia, ceiba, and their like. Here, away from the jungle battle of the survival of the fittest, one can better appreciate these pillars of God.

"Did the trees speak to you?" an old woodsman once asked me, as I rode in from the forest. I nodded in the affirmative, for they always do.

Old carved furniture made from the jacarandá brings a high price at the curio dealers in Rio. It is black and as hard and heavy as ebony. The sapucaia is the most beautiful of trees, with leaves that turn from pink to green in the spring, violet blossoms, and great seed-cups like those of the nut-bearing castanha, which we call the "Brazil nut." The ceiba, with its formidable buttresses, is so sure of its foundation that it towers above all other trees.

The Quinta da Bôa Vista, some distance from the heart of the city, was one of the country homes of royalty. This splendid estate, now Rio's finest park, was presented to Dom João by a Portuguese citizen. On the king's return to Europe it was claimed by English bankers for crown debts and purchased from them by the Brazilian Government. The palace is now the home of the National Museum.

National Geographic Society members would enjoy a visit to this museum, with its remarkable Indian collections from the upper Amazon; its Brazilian birds, butterflies, woods, and minerals; and its gallery devoted to "Rondonia," the newly



Photograph by Harriet Chalmers Adams

THE VEGETABLE SELLER: RIO DE JANEIRO

The photograph shows one of the steep streets leading up a canyon of the city. The houses here are reached by a long flight of steps and the servants come down to the street to meet the vegetable man when he calls (see text, page 173). There are 1,148 vegetable-sellers in the city.

XUM

Photograph by Harriet Chalmers Adams

CASTLE HILL OR MORRO HILL: RIO DE JANEIRO

This is the historic part of town, where the founder of Rio is buried. It is the oldest part of the city and is now given over to the very poor and their goats and chickens (see text, page 185).

Photograph by Harriet Chalmers Adams

RIO ICE-CREAM WAGON

Ice-cream and peanut wagons are very popular in the Brazilian capital. Speaking of nuts, Brazil is the home of the nut-bearing castanha tree, whose fruit is known to us as the Brazil nut.

XUM

Photograph by Harriet Chalmers Adams

THE BROOM-SELLER: RIO DE JANEIRO

He also sells feather dusters. The feathers come from Argentina and are made of the plumage of the native rhea, or South American ostrich.

Photograph by Carlos Bippus

A FOOTBALL MATCH IN RIO DE JANEIRO

Football, racing, and rowing are the three favorite sports. The Brazilians do not play Rugby but Soccer football. In the football contests last season Brazil won from Uruguay, Argentina, and Chile. Baseball is popular with the American colony. There are about 1,500 Americans in Rio.

discovered land in Matto Grosso, named for General Candido Rondon, the Brazilian explorer.

"INDEPENDENCE OR DEATH!"

In 1821 Dom João returned to Lisbon, leaving his son, Pedro, behind. Brazil's independence was foreshadowed, and in his farewell letter to his boy the king urged him "to place the crown on thine own head rather than have it fall to an adventurer," even though it meant their lifelong separation. This led to that fateful September hour in 1822 by the River Ypiranga when Dom Pedro uttered his battle-cry, "Independence or Death!" Thus the seventh of September is the Brazilian Fourth of July and "Ypiranga" the slogan.

In choosing the national hero, Brazil named not Tiradentes, but Bonifacio—José Bonifacio de Andrade e Silva—who lived between 1763 and 1838. Born in Santos, he went at eighteen to Portugal, where he received degrees in law and philosophy and fought for the mother country against France. Returning to Brazil as an educator when he was past fifty, his name soon stood for his country's independence. It was he who persuaded Dom Pedro to proclaim the Brazilian monarchy. He was a minister in the first emperor's cabinet and tutor and guide to his son, who became Pedro II. His portrait represents a gentle, gray-haired man with an intelligent, rather sad face.

Beyond the stirring Ypiranga prelude and a magnificent equestrian statue commemorating independence, there are today in the capital few reminders of Brazil's first emperor. Owing to political strife, he abdicated in 1831, retiring to Europe, as his father had done, leaving the throne to his son, then a child of six.

EVERY INCH AN EMPEROR

There is an historical painting which brings the abdication scene to us. It is night in the palace. Soft candle-light fills the room. The emperor, tall and grave, is standing near a group of men. He hands the fateful document to the minister. The empress, seated on a divan, with her arms about a golden-haired boy, weeps. A woman, kneeling, kisses the fair boy's hand—"Long live Dom Pedro II!"

And so Brazil's best beloved ruler, whose long, useful life was devoted to the welfare of his people, but whose old age was so tragically embittered, came into his own.

Dom Pedro II is Brazil's biggest name. He it was who led his country into the brotherhood of great nations. With him wisdom and kindliness were preëminent. Every inch an emperor, he yet was accessible to the humblest of his subjects. There is much in the city where he lived for so many years still closely associated with his rule, which ended only the other day, as we count history—1889. In the coat of arms of the House of Bragança, still to be seen on many of the buildings; such street names as Marquez de São Vicente, Barão de Petropolis, Visconde de Maranguape, and the titled Brazilians one still meets in the country, we realize that not so many years ago Rio de Janeiro was the abode of royalty.

A WOMAN'S HAND FREED 1,500,000 SLAVES

Closely associated with imperial rule in its decline was the emperor's daughter, Dona Isabel. While princess regent, during one of her father's visits to Europe in search of health, she signed the most vital decree ever issued in the country. I saw the original document in the Hall of Archives and the pen, set with diamonds and emeralds, with which the princess signed it, the decree of May 13, 1888, which liberated 1,500,000 slaves.

As early as 1580 there were 10,000 African slaves in the country, 20,000 "tame" Indians, 5,000 mamelucos of Indian and African blood, and 15,000 Portuguese colonists. Following Dom João's arrival, in 1808, 20,000 slaves were imported annually. After Portugal recognized Brazil's independence a convention concluded between Great Britain and Brazil, operative in 1830, made the carrying on of the slave trade by Brazilians illegal and to be treated as piracy. A great number of negroes captured from slave-runners by British vessels were turned over to the Brazilian Government as "free Africans."

Great Britain afterward claimed that

Photograph from Harriet Chalmers Adams

INSTITUTE OSWALDO CRUZ, IN A SUBURB OF RIO DE JANEIRO

Supported by the Brazilian Government for scientific medical investigation, and named after Dr. Oswaldo Cruz, who practically eliminated yellow fever in Rio and did so much for the health of its citizens. He died three years ago, at the age of 45. The institute building is in Moorish design and coloring, exterior and interior, and commands a splendid view of the bay. There is a noted American pathologist on the institute's staff.

many of these "emancipados," supposed to be wards of the government, were sold into slavery, and this led to no end of investigation and trouble. At this time it was claimed there were 3,000,000 negroes in Brazil. This number gradually decreased as the children of slaves were liberated and the African blood more or less absorbed. Today the Brazilians are, on the whole, without racial prejudice.

The decree of 1888, which freed all slaves, was immensely unpopular with many of the country's leading men, who claimed the princess regent had been unduly influenced by her clerical advisers. This was one of the reasons for the fall of the empire, although that event may be largely attributed to discontent all over the country, owing to the centralization of power in the capital. An Englishman who lived in Rio during these

Photograph by Harriet Chalmers Adams

SWEEPER IN ONE OF RIO'S PARKS

He uses a primitive type of broom, made from the trees or bushes. Only the wooden handle he buys. These men seem to love their work, for they are in parks and gardens, and to the Portuguese-speaking peoples of the world the garden is the art gallery.

eventful days of 1889, when Brazil's last emperor was sent into exile, told me of the event.

"WE WENT TO SLEEP IN AN EMPIRE AND AWOKE IN A REPUBLIC"

"It came about so quickly and quietly we could not realize it," he said. "There was hardly a shot fired. Dom Pedro and his family were taken from the palace at night and put aboard a cruiser, from which they were transferred to a steamer bound for Lisbon. They said the Emperor was dazed, the Empress and Princess Isabel in tears. We went to sleep in an empire and awoke overnight in a republic."

Dom Pedro II died in Paris in 1891. Princess Isabel, who married the French Comte d'Eu, still lives in France. In 1908 her elder son renounced his claim to the throne of Brazil in favor of his brother, Dom Luiz, whose little son, born in 1909, is Pedro the Third.

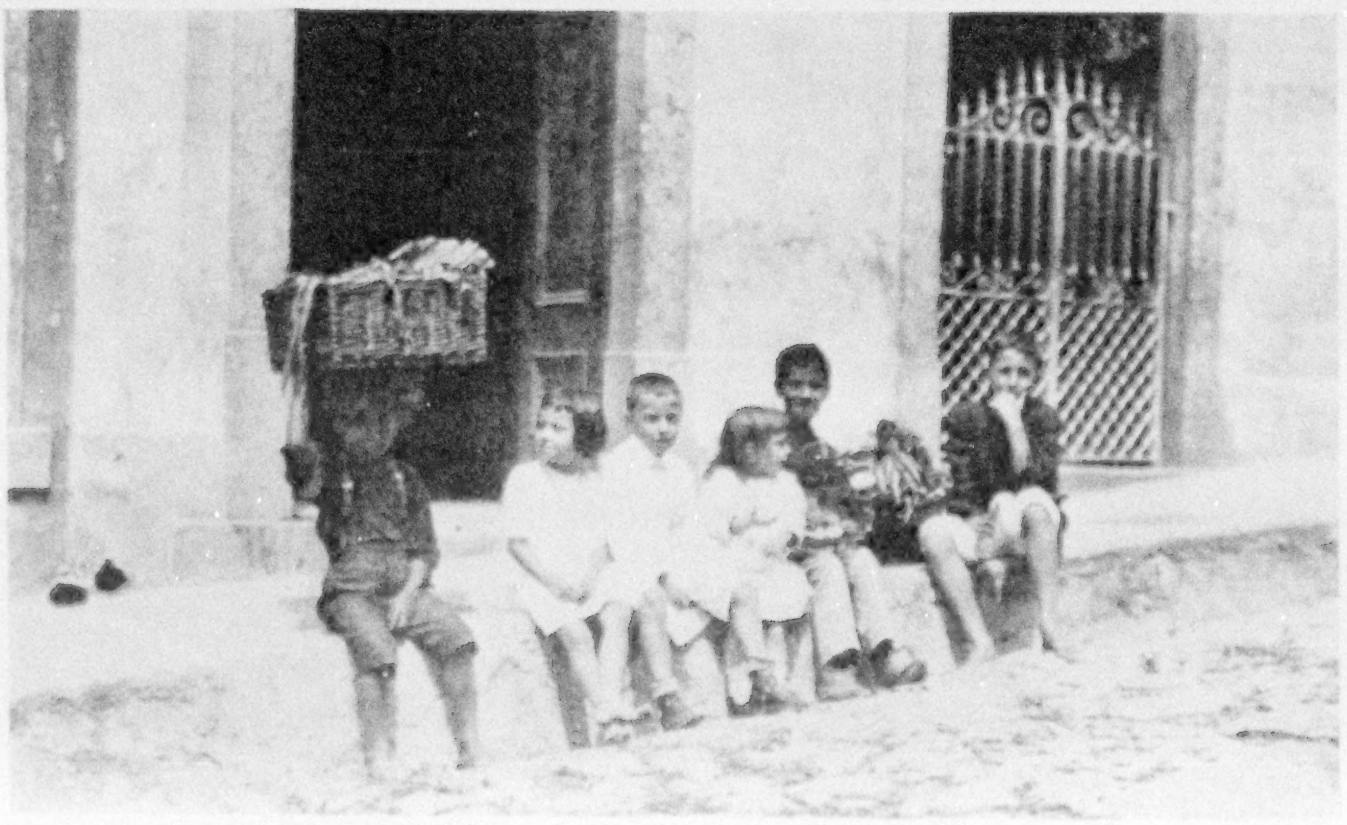
When in Lisbon I visited the Pantheon, where the rulers of Portugal lie. Exiled from his own country, Dom Pedro II also found a resting place in the land of his forefathers. I was most unfavorably impressed with this Pantheon. It altogether lacks the beauty and dignity of the royal mausoleum of the Escorial in Spain. For the payment of a small fee, the custodian permits you to climb a ladder and gaze at the embalmed body of the last Emperor of Brazil. This seems most unfitting.

There is a movement under way to build a national pantheon in Rio de Janeiro and bring to it, at the time of the 1922 centenary, the remains of Brazil's historical personages, including João VI, Pedro I, Pedro II, and his consort. To this the Portuguese Government will probably consent, and it is to be hoped that Princess Isabel, too, will agree. Dom Pedro II should return with honor to the land of his birth. The difficulty lies in the fact that neither the princess nor her sons are permitted to enter the Republic of Brazil and could no longer visit the family tomb.

XUM

SPLITTING PALM FOR FOOD IN THE MARKET: RIO DE JANEIRO

With a French dressing it is very good, but most people prefer it boiled and serve it with a butter sauce. Brazil is the land of palms, and these trees supply about every need for the country folk.



Photographs by Harriet Chalmers Adams

THE INTRUDERS

When the author started to make this photograph the well-dressed children only were on the sidewalk. Along came boys with baskets on their heads and decided they would be "snapped," too. The other children, especially the first little girl, rather resented it.

Avenida Rio Branco, Rio's finest thoroughfare, is named after a celebrated Brazilian statesman, Barão de Rio Branco, who, as Minister of Foreign Affairs, successfully settled the country's boundary disputes without resorting to arms. In 1904 it was decided to carve this great modern avenue out of the city, over six hundred homes being sacrificed.

The avenue, more than a mile in length and so wide that it consists of two distinct boulevards separated by a row of shade trees, is thronged day and night with automobiles. Motorists here keep to the right instead of to the left, as in Buenos Aires. Pedestrians also are requested to keep to the right, and should you forget, a policeman politely reminds you.

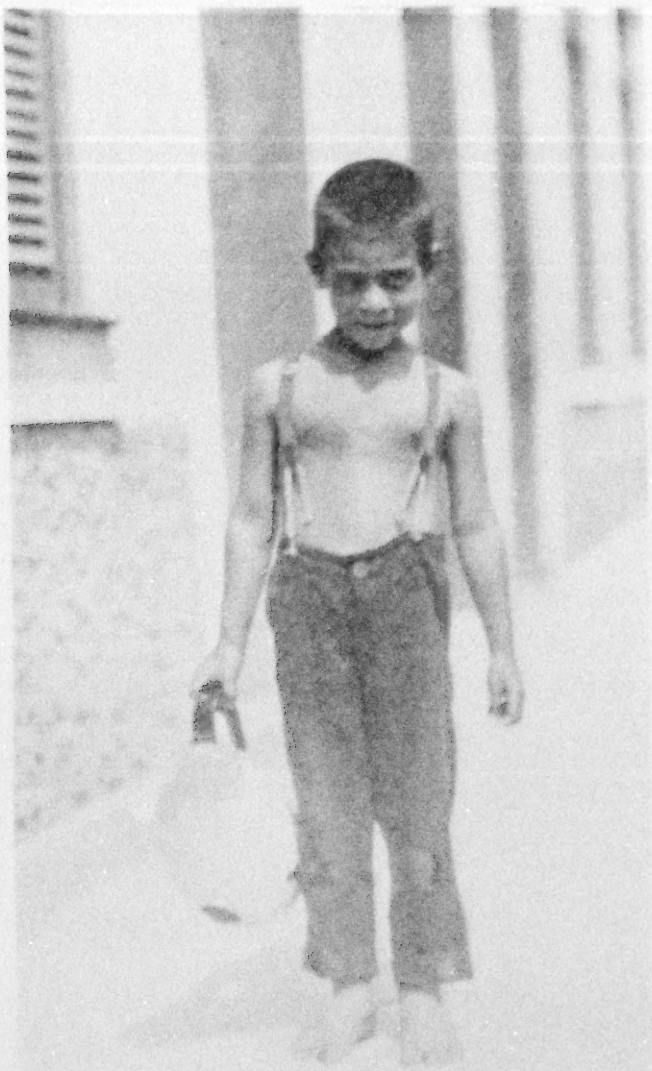
The sidewalks, the widest I have ever seen, are of black-and-white stones laid in mosaic designs, like those in vogue in Lisbon. Both stones and workmen were brought from Portugal, but similar pavements, constructed later in other parts of the city, are "home made."

They tell a story of an American sailor who one night lost his way in Rio. Accosting a pedestrian, he asked to be taken back to "that street with pretty pictures on the sidewalks."

Before it was called "Rio Branco," this thoroughfare was known as Avenida Central. They have a disconcerting way here of changing the name of a street. Sometimes the new name "takes"; but again, as in the case of Rua Ouvidor, the old one "sticks." Rua Ouvidor's new name is "Moreira Cesar"; but the merchants on this most fashionable shopping street refuse to sever connection with the old name, so long identified with the best in the city. The street dates back to colonial days, when this was a residential section and the Portuguese auditor, or "ouvidor," made this his home.

RIO ENJOYS REAL LUXURY AT THE "MOVIES"

Rua Ouvidor and Rua Gonçalves Diaz, named after a favorite poet, are unique. They are exceedingly narrow, with diminutive sidewalks; but, as no traffic is allowed, pedestrians walk in the street. On many other equally narrow streets one-way traffic only is permitted; but even here pedestrians have rather a bad time of it dodging motors, trams, and trucks.

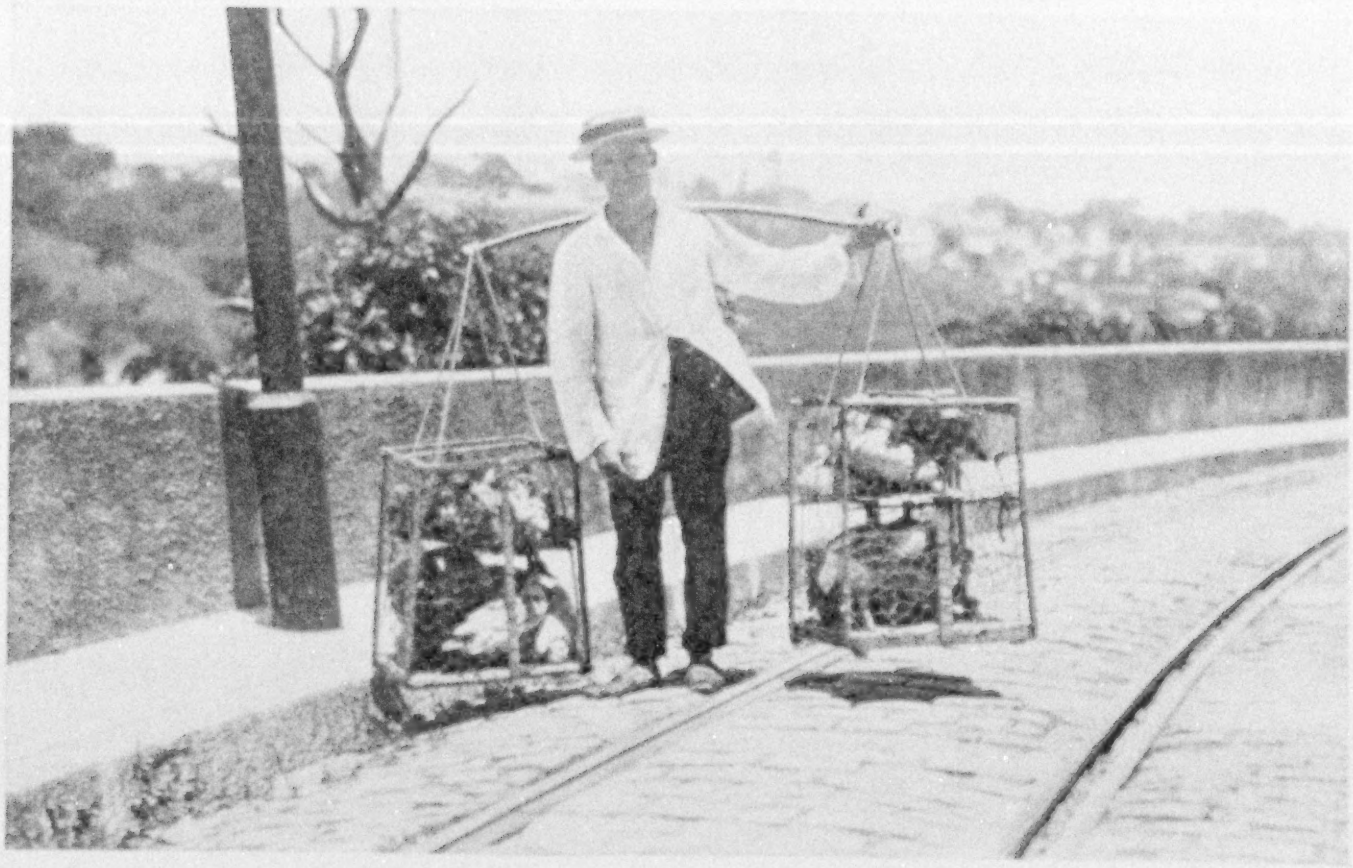


Photograph by Harriet Chalmers Adams

MOTHER HAS SENT HIM ON AN ERRAND

It looks suspicious, but he is going for milk or for fresh water. The Brazilians are temperate folk. They have learned to drink beer, and there are breweries, especially in southern Brazil, where there are so many Germans; but they prefer wine, as the Portuguese do.

It is at the cinema theaters that the Cariocas know real comfort; for, unlike our moving-picture houses, those in Rio have spacious waiting rooms, where you sit, listening to excellent music, until the hour for the first reel comes round. The pioneer house of the kind inaugurated this custom, and now the people refuse to stand outside waiting for the even hour to arrive, or to enter after the film has started. With so much profitable space taken from the auditorium, the "movies" in Rio are not as great money-makers as with us. The American favor-



THE CHICKEN AND DUCK SELLER

They help him to cry his wares. You are sure of getting your fowl fresh. He is toiling up the road by which the tram ascends to Santa Thereza Hill, and Sylvestre on the slopes of Corcovado.

Photographs by Harriet Chalmers Adams

THE ONION-SELLER: RIO DE JANEIRO

Like the Portuguese and Spaniards, the Brazilians are very fond of onions and men earn a livelihood selling them on the streets of the city. Like all the other street sellers, the onion man has his particular cry to attract attention—perhaps unnecessary, if to windward.

DELIVERING TAMANCOS, OR WOODEN SHOES

This is the typical footgear of the working people of Rio. The shoes are manufactured in the city and are not unlike the type of shoe worn by the Filipinos—that is, in their form. They have wooden soles and their "clap-clap" is like that heard on the streets of Japan.

Photographs by Harriet Chalmers Adams

ONE OF RIO'S 454 LICENSED CAKE-SELLERS

The cake-seller is on every street of the down-town section of Rio and is especially in evidence at the entrance to parks. The Brazilians are very fond of sweets, and the cakes are as rich as French pastry. They are carried in glass cases.

XUM

Photograph by Carlos Bippus

THE PALMS ON THE ATLANTIC SHORE, AVENIDA NIEMEYER, BY THE SEA: RIO DE JANEIRO

This avenue, carved from the rock, overhangs the sea. It connects Leblon Beach with Gavea Beach at the foot of Gavea Rock, where there is a plantation dating back to colonial days. From Gavea Beach the highway, which encircles Rio, climbs up over Tijuca Mountain, dropping down to the bay side of the city. Below Avenida Niemeyer a sheer wall of granite rises from the water's edge. Note the native falua of a fisherman offshore.

ites are popular, quite outclassing Italian and Brazilian film stars.

The lottery plays an important part in the life of the people, and is so well established that it is often used to raise money for charities, and is not frowned on by religious bodies. There are daily drawings, tickets being sold in shops in the heart of the city as well as on the street. You can play the national or the federal lottery, or those of the States of Rio de Janeiro, São Paulo, or Rio Grande do Sul. It is illegal to play the lottery known as the "Jogo do Bicho," dear to the heart of the working class, which is operated without a concession, although thousands do play it.

In the legal lotteries you pin your faith on a number; in the "bicho" you place your wager on the cat, the dog, the rabbit, or some other animal or *bicho,* corresponding to a group of numbers in the day's national lottery drawing.

"I dreamed of a snake last night and am sure it will win today," my laundress, firmly addicted to the "bicho," told me; and, whether she wins or not, she and Manuel and all the rest will keep on squandering their hard-earned milreis.

SCIENTIFIC SANITATION HAS TRANSFORMED THE BRAZILIAN CAPITAL

Great credit is due to the Brazilian scientist, Dr. Oswaldo Cruz, who died in 1917, while still in his forties. He it was who made the fight for sanitation, completely transforming the capital. His memorial is the Oswaldo Cruz Institute, of which he was the first director, maintained by the government for medical research. On the institute's staff is an eminent American pathologist.

An American public health specialist is director of the Brazilian branch of the Rockefeller Foundation's work for the eradication of hookworm and malaria. His main office is in Rio and the work is under way in many stations throughout the republic. In São Paulo, Brazil's second city, I met a third celebrated American scientist, formerly of the Canal Zone.

These Americans were of great service during the influenza epidemic, at its worst in October, 1918, when 2 per cent of 600,000 cases in the capital proved fatal. Fifty-seven American sailors on a battleship in the bay succumbed to the disease. Their companions in the navy are erecting a monument to their memory in São Francisco Xavier Cemetery, which overlooks the bay.

RIO'S POPULATION ENUMERATED ACCORDING TO NATIONALITIES

The population of the capital exceeds 1,000,000. Among foreigners there are 154,000 Portuguese, 30,000 Italians, 24,000 Spaniards, 4,000 French, 3,500 Turks, Syrians, and Arabs, 3,000 Germans, 2,000 British, 1,500 Spanish-Americans, 1,500 Americans, and 600 Asiatics. The Germans are now arriving on Dutch boats in great numbers, but the majority are bound for the South Brazilian States.

Rio's climate is often maligned, but it suits those who like spring and summer weather. It is never as warm as summer in many of our Eastern and Middle West cities, and the nights on the hills are nearly always cool. The pleasantest season is between May and November; the warmest months are January, February, and March. It is hard to say just which is the rainy season, as showers are frequent throughout the year.

I have often been asked by East Coast voyagers, whose ships stop only one day in Rio, "Which of the excursions shall we make?" The choice is between Corcovado and Sugar Loaf. The summits of both are easy or access, the views incomparably grand.

RIO'S TWO FAMOUS SUMMITS COMPARED

Corcovado (the Hunchback) is ascended by trolley to the head of a canyon; by electric cog railway two miles or more up the mountain; by a flight of steps to the covered pavilion on the summit. The altitude is only a little more than 2,000 feet; yet the view is really more remarkable than one I obtained after toiling to the summit of a Peruvian mountain more than 19,000 feet above the sea. You overlook a vast circular panorama of mountain, city, and sea in form and color no painter can adequately portray.

Sugar Loaf should be called "The Crouching Lion." The giant monolith is far too majestic for its present name. Its

crest is reached from Vermelha Beach, on the Rio shore, by aërial ropeway. The car lands you first on the summit of a lesser rock, Úrça, where there is a park and restaurant, the second longer flight carrying you high above the forest, with the sensation of sailing in a balloon. On up you float, skirting the great granite cliff, landing at last on the very peak of the rock. A cyclopean task, the building of this aërial railway!

The view, while altogether different from the Corcovado panorama, is magnificent. You are well out in the bay, directly above the forts which guard the entrance, looking back on Rio's crescent shore. As the glowing coppery sun drops behind the jagged mountain tops, dusk envelops the land in a mystic reddish haze. One by one the lights of the city gleam out. Night falls and Rio is a bejeweled goddess on a purple velvet throne.

A SUGGESTION TO THE SHOPPER IN THE BRAZILIAN CAPITAL

"What," asks the prospective tourist, "can I buy in Rio—something distinctly Brazilian?"

If you yearn for a parrot or a monkey, both are on sale in the city's mammoth market by the waterfront, with its sixteen miniature streets and four hundred and seventy-two compartments. With the exception of the little brown monkeys, the whistling sabiás from the hills back of Rio, and the scarlet-crested birds from Rio Grande do Sul, all the animals and birds come south on "coasters" from northern Brazil, and can be bought for less money in Pernambuco, on your way home.

Brazilian diamonds come from the near-by State of Minas Geraes. They are not as large or as clear as South African gems. Other native stones of lesser value include the amethyst, topaz, aquamarine, and tourmaline, the last in many colors.

It is easy to go sightseeing in Rio. Automobiles, which here observe no speed limit, rent for ten milreis an hour—about three dollars in our money at the present rate of exchange. Victorias, drawn by a smart pair of mules, are less expensive.

FIRST-CLASS TROLLEY LINES AND THREE-CENT FARES

Horses are nearly obsolete, an epidemic having carried them off many years ago. Were it not for equestrian statues in the parks and the occasional appearance of the Brazilian cavalry, the little Fluminese might acclaim a horse in the "zoo" as a strange and interesting animal.

In no other city which I have visited is trolley riding so delightful. The Canadian company, known locally as "The Light," supplies electric power and operates an elaborate system of trams, or "bonds," as the Brazilians call them. The first electric road issued bonds; hence the name.

To every part of the city, to the mountains, ocean beaches, and far-distant suburbs, these trams carry you in comfort. The open cars are large and solidly built. No crowding is allowed; every one is seated. Smoking is permitted on all but the first three seats. The fare varies with the distance, one hundred reis (about three cents) for each section. There is little or no dust in Rio, which adds greatly to the pleasure of the ride.

I have twice visited this Brazilian fairy-land. I long to return. Now and then on our way through life we meet a man or a woman with an individuality which grips, and now and then on the wide world trail we find a scene which dominates. Such is Rio de Janeiro, City of Lure.

So long as glory of form and color gladden the eye, Rio will stand preëminent in beauty among the habitations of man.

Photograph from Gardiner F. Williams

A LASTING TRIBUTE TO A NOBLE QUEEN: VICTORIA FALLS ON THE ZAMBEZI, SOUTH AFRICA

This famous waterfall was discovered in 1855 by David Livingstone, and by him named for England's queen. Today the railway bridge which crosses the narrow canyon below the cascade is an important link in the Cape-to-Cairo line. Varying from 256 to 343 feet in height and more than a mile in width, the falls of the Zambezi plunge from a basalt escarpment to a narrow chasm, parallel to the face of the cataract, to which this narrow gorge is the only outlet.

Photograph by Ernest Fox

WHEN THE MOON LIGHTS THE DIAMOND HORSESHOE OF NIAGARA

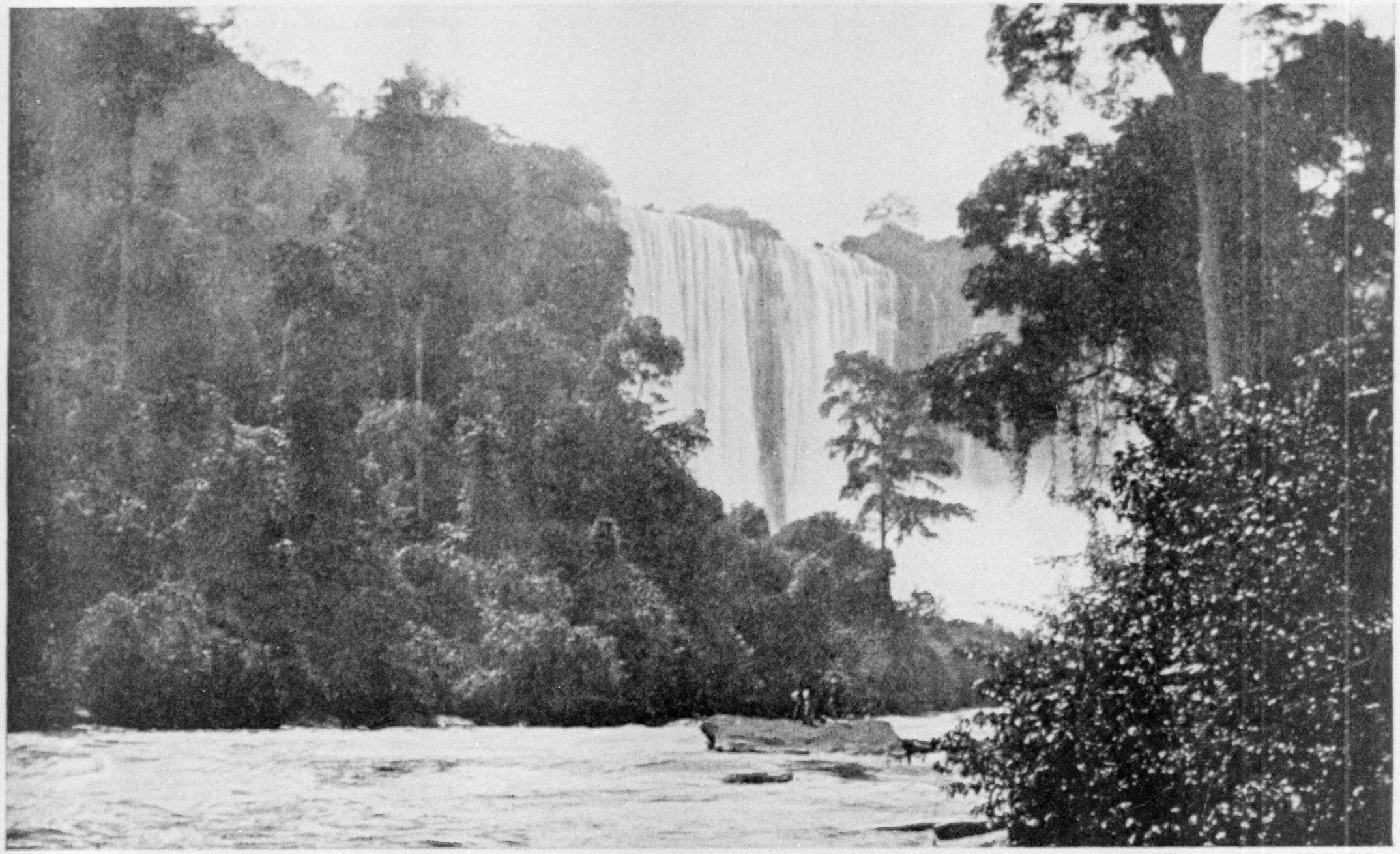
The falls of Niagara have been pictured to countless visitors in a thousand ways. Now stunning with immensity, now charming with the wind-whipped wisps of slowly settling spray, now deafening with the stentorian voice of many waters, the wondrous spectacle is many things to many men. Jack Frost transforms its moving mass into an inert glacial wall. But never is the eery grace of Niagara better shown than when the white light of the moon touches with fairy phosphorescence the dark masses of rushing water.

XUM

Photograph from L. Melano Rossi

THE BASHFUL FALLS OF THE IGUAZU

Hiding in the wild wooded country near the spot where Brazil, Paraguay and Argentine meet are the falls of the Iguazu. Twenty or more cataracts averaging 200 feet in height and separated by rock masses and tree-clad islands here seek to conceal their loveliness behind a veil of mist, and only when a friendly wind dissipates the clouds of spray can the falls be clearly seen. Light draft steamers go up the Parana as far as the mouth of the Iguazu, whence the pilgrim in search of such secluded loveliness must take a native canoe.



Photograph by Rev. W. P. Dodson

CASCADE OF DIANZUNDU, LUCALLA RIVER, PORTUGUESE WEST AFRICA

Like the Falls of the Iguazu, the cascade of Dianzundu is not formed of one immense cataract, but is a veil of water spread across the face of a stratified cliff, surrounded by dense jungle. The main falls are at the extreme left and from there the waters spread out to many times their height of 200 feet, producing a most pleasing bit of light and motion.

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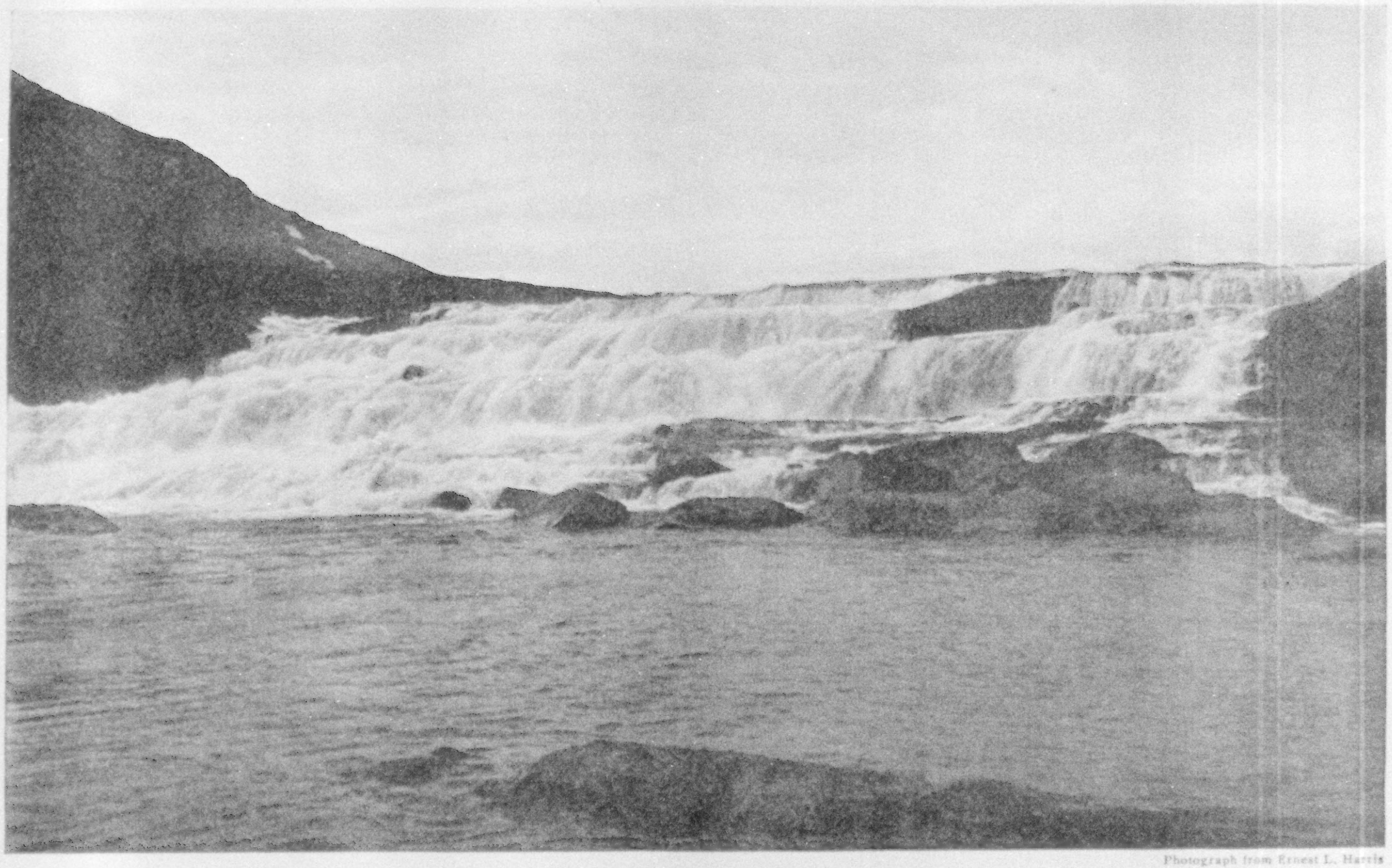
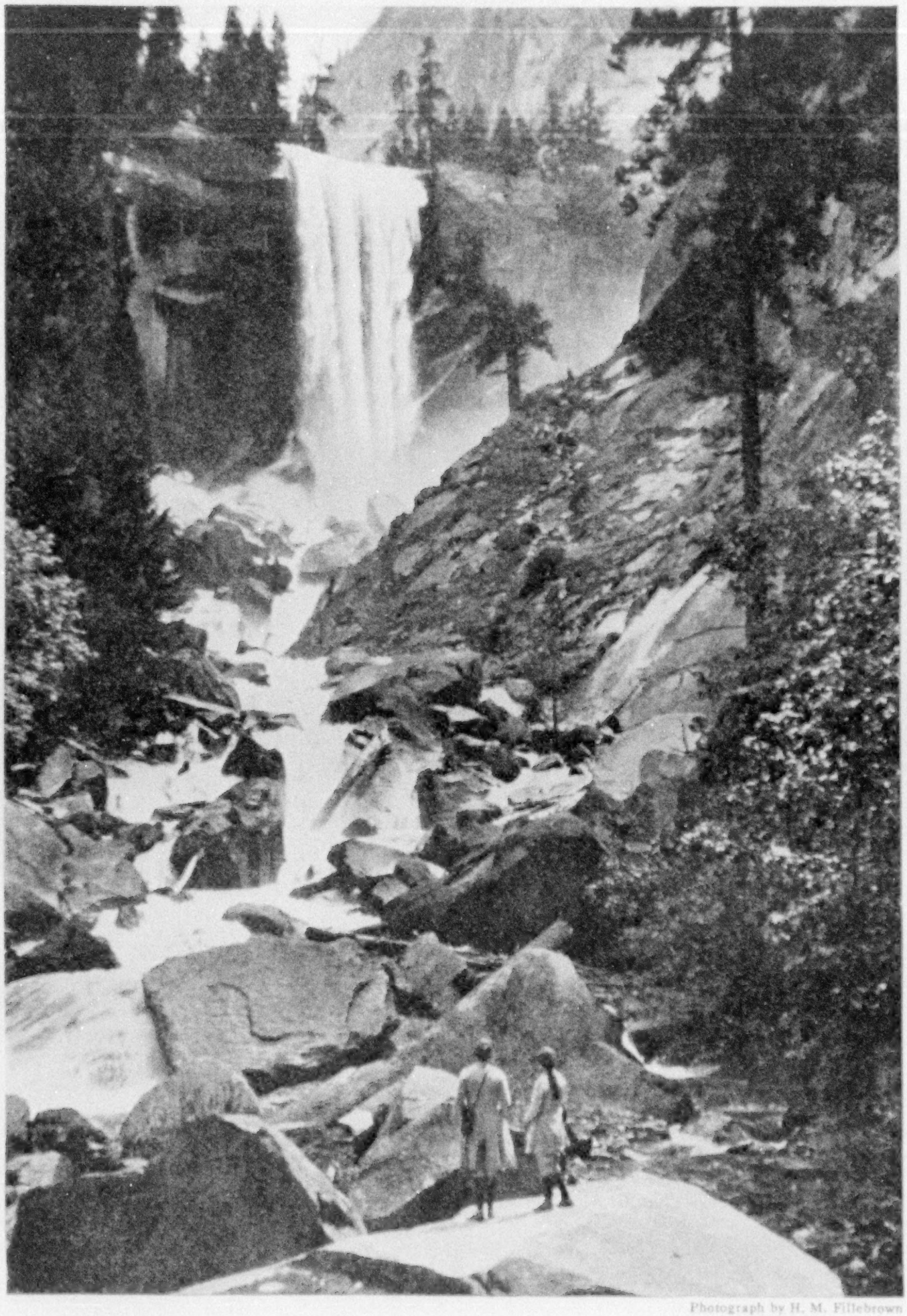


Photograph from Ernest L. Harris

FALLS OF THE STORA SJOFALLET, SWEDEN

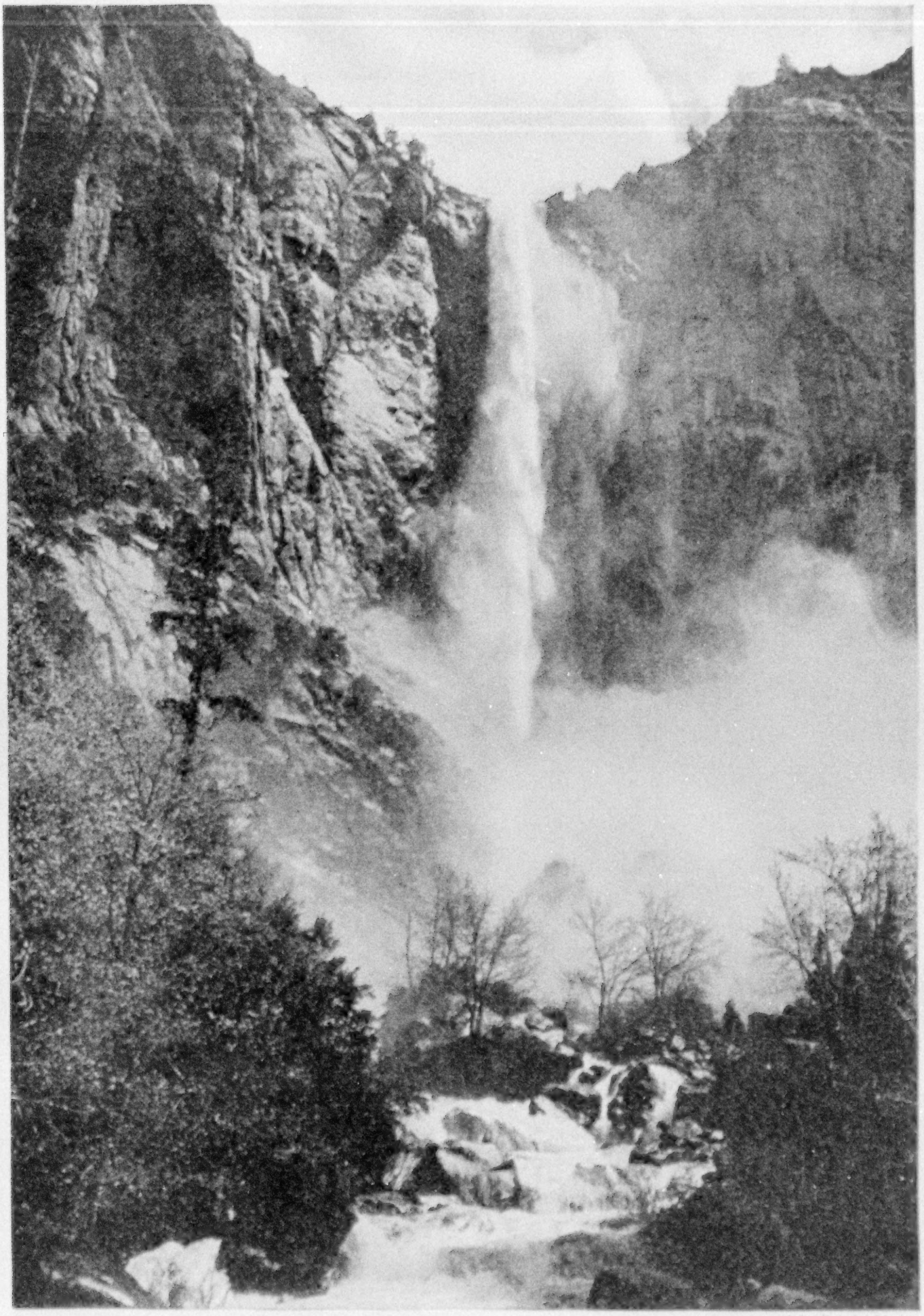
Like the waves on a rugged coast are the successive reaches of the Stora Sjofallet. There is a sheer fall of 100 feet and a mile and a quarter of rapids in which there is a drop of 150 feet. This beautiful cataract is situated in an uninhabited region in the extreme north of Sweden.



Photograph by H. M. Fillebrown

VERNAL FALLS, YOSEMITE NATIONAL PARK, CALIFORNIA

Conventional in outline, massive in its power, Vernal Falls, 317 feet high, gains not a small portion of its charm from the rock-strewn path of its foaming waters below the precipice. Good horse trails lead to points of vantage from which to view the main cataract and a lookout point is balanced on the very brink, but to many the loveliest view is that of the rugged valley looking toward the cascade projected against the mountain peaks that gave it birth.



Photograph by Gabriel Moulin

BRIDALVEIL FALLS, YOSEMITE NATIONAL PARK, CALIFORNIA

Like loving bridesmaids the friendly winds of the Yosemite Valley are continually seeking a more charming drapery of the Bridalveil. Masses of water, which would kill a man or smash to bits a rock less durable than the granite against which only the patient glacier has proved its power, here fall like lightest fabrics to the valley floor. The valley which was once filled by a lake is now carpeted with flowers reaching from the towering cliffs against which the bridal veil is hung to the sparkling waters of the Merced River.

Photograph by Bourne and Shepherd

CASCADES BETWEEN PRESLANG AND TANNIN, INDIA

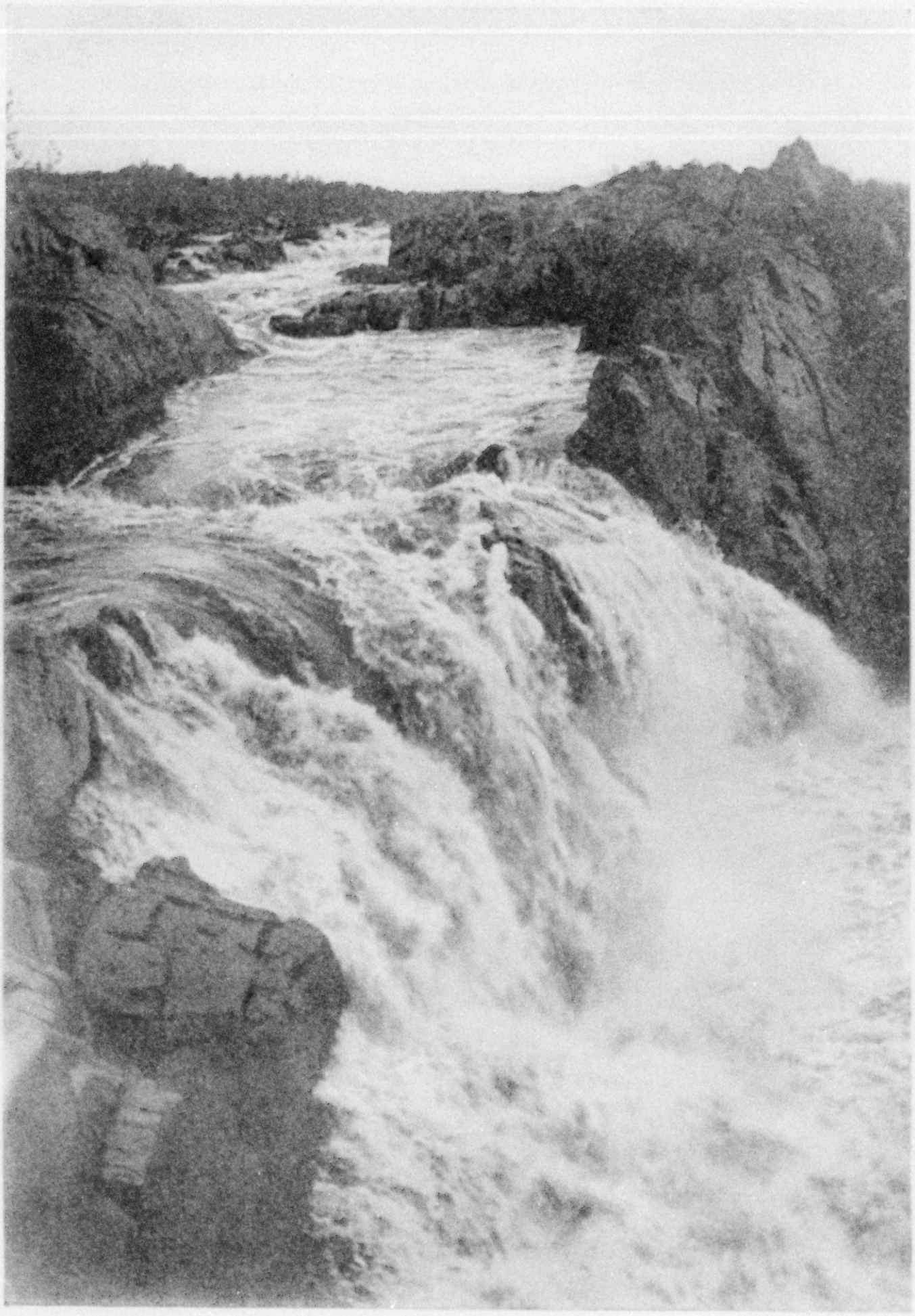
These lovely waterfalls, whose voices echo through the dense jungle in the midst of which they are hidden, are little visited by foreigners. But when the rainy season comes and the rush of waters reaches its maximum, the Indian philosopher might well come here to ponder on the insignificance of man. There is an awe-inspiring sublimity about such rugged beauty which appeals to the mind of the contemplative East.

XUM

© A. Schlechten

LOWER FALLS OF THE YELLOWSTONE, FROM LOOKOUT POINT, WYOMING

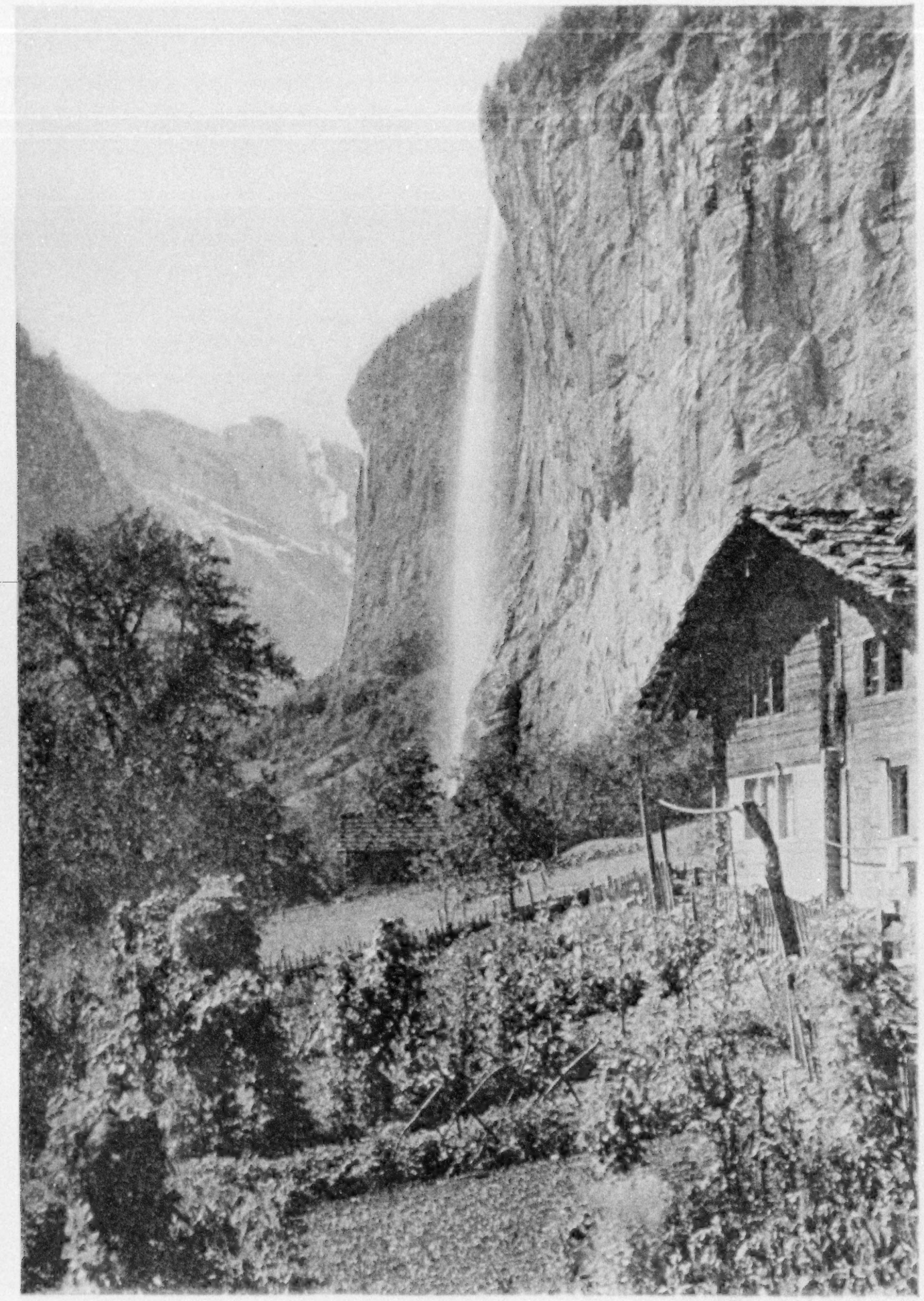
A canyon more verdant and colorful than the Grand Canyon of the Colorado; a limpid-green river, sequin-trimmed with snowy riffles and glistening foam; and a graceful, regular waterfall, almost as high as two Niagaras fill the view from Lookout Point. Yellowstone Park comprises 3348 square miles of wilderness and wonderland for man and beast and is the greatest wild bird and animal preserve in the world.



Photograph by E. L. Crandall

GREAT FALLS OF THE POTOMAC: NEAR WASHINGTON, D. C.

The Potomac is the best example of the short rivers of the Atlantic watershed which rise in the plateau region, flow across the ridges and valleys of the stratified belt, and then burst their rock strewn path through the crystalline belt to the sea. The Great Falls of the Potomac are to be the terminus of a fifteen mile Riverside Drive from the nation's Capitol. The series of rapids is about a mile in length and includes this splendid 35-foot cataract.



Photograph by Gebr. Wehrli

THE SPRAYBROOK AT LAUTERBRUNNEN, SWITZERLAND

Grace, rather than volume, distinguishes the Staubbach. This mere brook, seeming to poise for a moment at the lofty take-off, falls almost reluctantly from the jutting precipice, 980 feet above the valley floor. Here is no hurrying rush, but rather the leisurely unwinding of a silver ribbon against the dark face of the cliff. By moonlight the effect is marvelous, for the light cascade, dropping from its fastenings above, is transformed in mid-air to diamond dust of pale spray.

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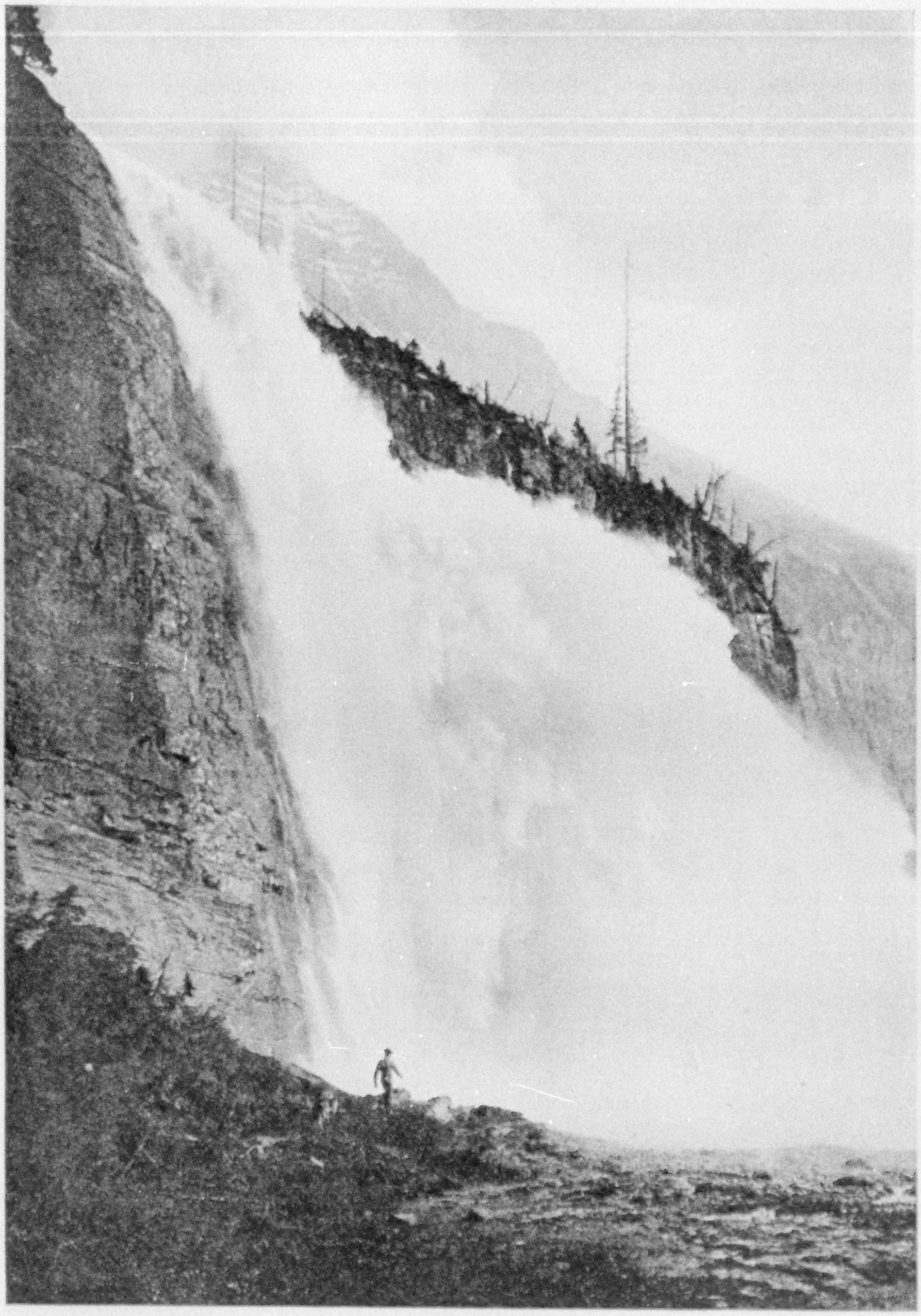
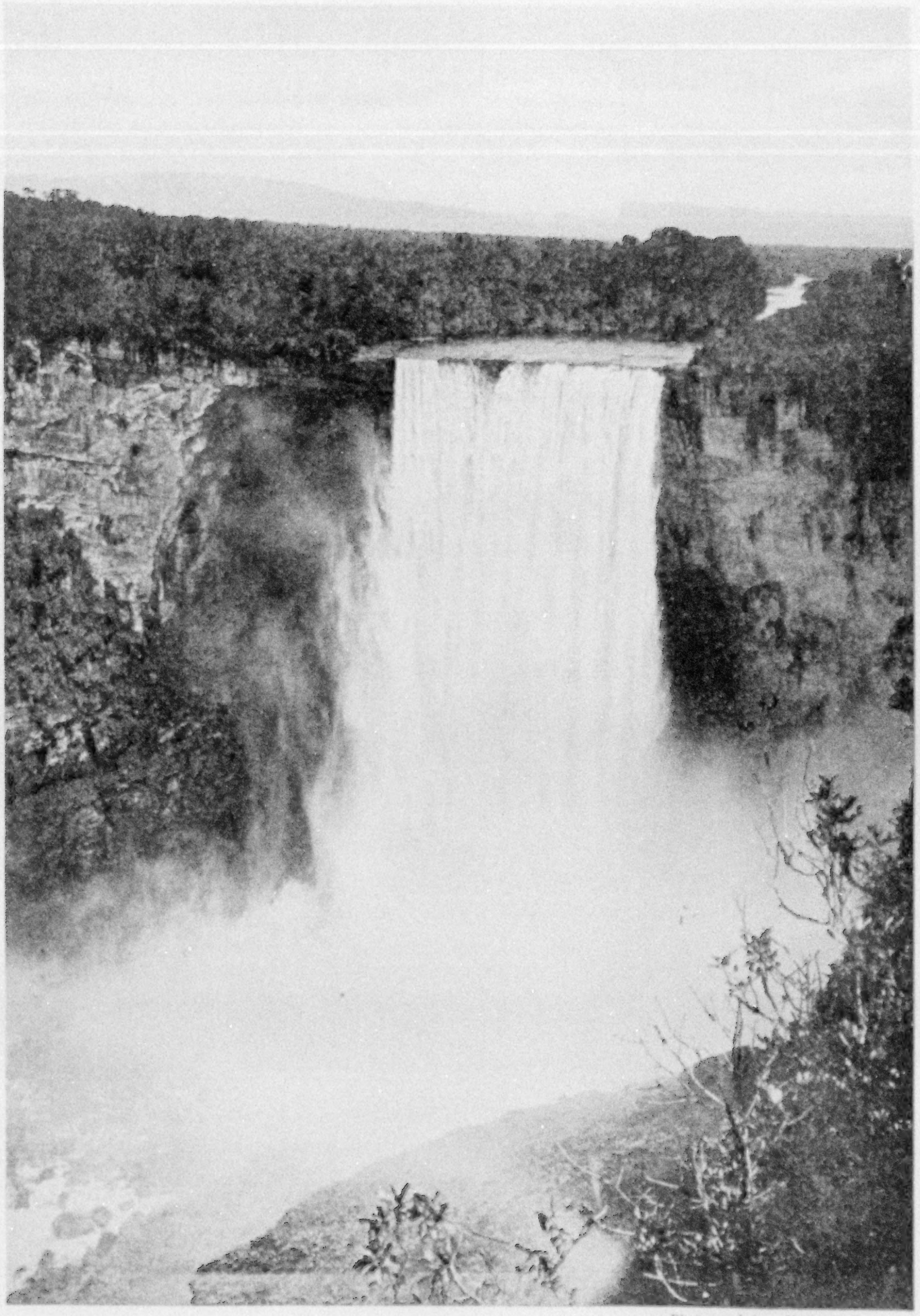


Photograph by R. C. W. Lett

EMPEROR FALLS, ON THE GRAND FORK RIVER, BRITISH COLUMBIA

The Norway of the North American continent is Southeastern Alaska and British Columbia, distinguished more for deeply indented coasts, gloomy fiords, and archipelagoes of innumerable islands than for inland rivers. Yet in such rugged, mountainous country, the rivers gain a certain magnificence from the wildness of their surroundings and the waterfalls range from the roaring cataracts of the narrow canyons to mist-like streams whose silvery ribbons cut the rugged faces of stupendous precipices.



Photograph from Henry E. Crampton

KAIETEUR FALLS, HIDDEN IN THE FORESTS OF BRITISH GUIANA

Situated in the midst of a highland forest near the center of British Guiana, these falls have the shape of the old Roman door, being twice as high as they are broad. They occupy the center of a vast amphitheatre and form a perfect example of the type of waterfall where the water, passing over a hard ledge, gradually carves a gorge through the softer rock below. The Potaro River, in whose course the Kaieteur Falls occur, is an affluent of the Essequibo and traverses a tropical forest whose dark background gives added beauty to this silvery cascade, 741 feet high.

© Pillsbury Picture Company

RAINBOW FALLS, JUST OUTSIDE THE CITY LIMITS OF HILO, HAWAII

Hilo is not only the second city of the Hawaiian Islands and the chief port of the largest of the group, but is also the gateway to Kilauea (next to Mt. Katmai the largest active crater in the world), Mauna Kea, the highest mountain peak, and Mauna Loa, which recently gave a spectacular exhibition of volcanic activity. Hawaiian rivers are small mountain torrents, rising and falling with the rains, but the hills back of Hilo sometimes have 250 inches of rain in a year, and when the river is at flood Rainbow Falls form a striking picture and their thunder can be heard throughout the city.

Photograph by A. B. Wilse

WHERE THE TOURIST STEAMER DISPLACES THE BURRO AND THE AUTOMOBILE: SEVEN SISTERS, NORWAY

One of the most beautiful of Norway's many famous fiords is the Geiranger, noted for its towering walls and numerous waterfalls. Those here shown are known as the Seven Sisters. Many of the smaller falls partly dry up in summer so that only a filmy tracery shows against the beetling cliffs.

© C. E. Bisbee

SHOSHONE FALLS: IDAHO'S INEXHAUSTIBLE WHITE COAL MINE

The most striking physiographic feature of southern Idaho is the Snake River, along whose crooked course fertile plains alternate with rugged stretches where the "white coal" of waterfalls awaits the modern engineer. Although modern electric power plants, each developing several thousand horse-power, have been installed at several places along the Snake River, less than three per cent of the available power is now utilized.

KAIETEUR AND RORAIMA

The Great Falls and the Great Mountain of the Guianas

By Henry Edward Crampton, Ph. D.

With Illustrations from Photographs by the Author

AS THE field for thorough scientific exploration, South America is at last coming into its own.

The great bulk of Africa has yielded up its secrets with astonishing rapidity since the not-distant days of Livingstone and Stanley—men whose work has been done within the memory of our elder generations.

But, until very recently, our sister continent of the South has remained what Africa was in the early nineteenth century: cities had been built along the coasts and at some inland points, precious minerals had been sought and found in the lofty Andes, but few besides the natives, themselves unknown to science, were aware of what the jungles and plains possessed.

Now the fallow field is receiving ever-increasing attention from men of science, and as the past era was that of Africa, so the present century is claimed by South America.

Although some time has elapsed since the writer made a journey of scientific exploration into the little-known interior of British Guiana and northern Brazil, yet the vivid impressions are in nowise dulled or effaced. On the palimpsest of memory the experiences group themselves about two principal focal points—the great falls of Kaieteur, far hidden in the forests of British Guiana, and the table-land of Mount Roraima, a feature of more than geological interest, which lifts its sheer walls at the point where Guiana, Brazil, and Venezuela come together.

The present account tells but a part of the story, which in all of its fullness can never be written; the experiences were unusual and varied, as they must always be in a region where distances are not reckoned in miles, but according to the dangers and difficulties incident to travel.

The general purpose of the expedition, which was undertaken in the interests of the Department of Invertebrate Zoölogy of the American Museum of Natural History, of which department the writer is the curator, was to run a "biological traverse" from the Atlantic Ocean to the heights of Roraima.

A glance at the topographic map of South America will show that in few other places, outside of the Andes, is it possible to draw a line that will cross so many different types of territory in the same short distance.

WHERE MANY FORMS OF LIFE IN NORTH AMERICA ORIGINATED

From the coastal plains, extending approximately two hundred miles inland from the ocean, an abrupt rise to the higher forests of Guiana and of certain Amazonian tributaries is followed by a similar rapid passage to the dry and open savannas of northern Brazil, and these in turn culminate in the Pakaraima Range of mountains, whose highest element is Roraima.

The region about Roraima was chosen as the goal because of its great geological age and the antiquity of its fauna and flora. From this place originated many of the living forms of the Antilles and of southern North America when the northward retreat of the ice-sheets formed during the Glacial Period permitted the establishment of climatic conditions favorable for organisms of the hot and temperate regions.

Ere the eventful journey was begun, some weeks were devoted to field-work in the Lesser Antilles from St. Thomas southward, especially in Dominica, which far surpasses the other islands in natural beauty. Here the party included Roy W.

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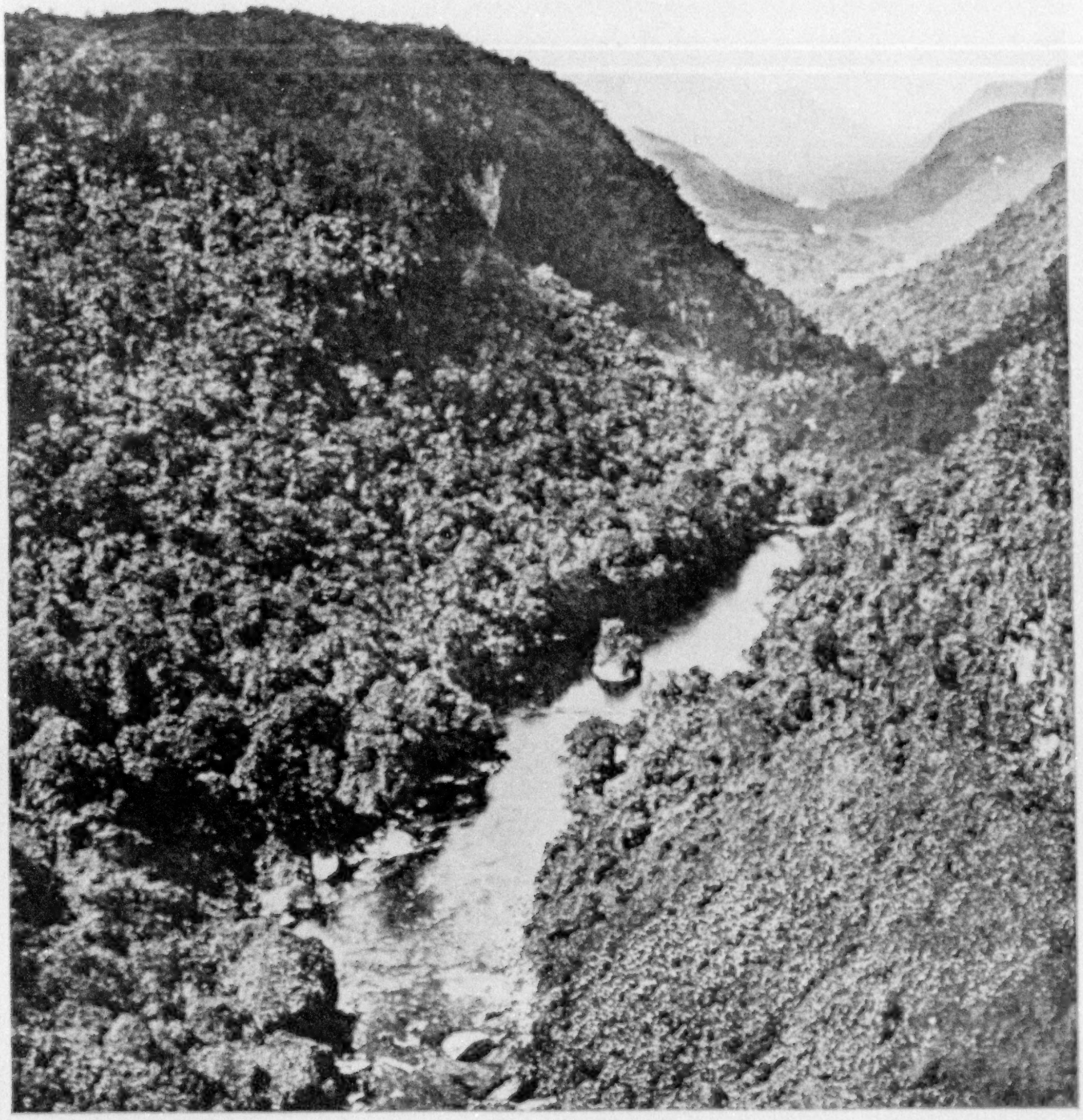


THE POTARO RIVER WINDS ON THROUGH THE GORGE OF KAIETEUR, WITH ITS STEEP SIDES A THOUSAND FEET IN HEIGHT

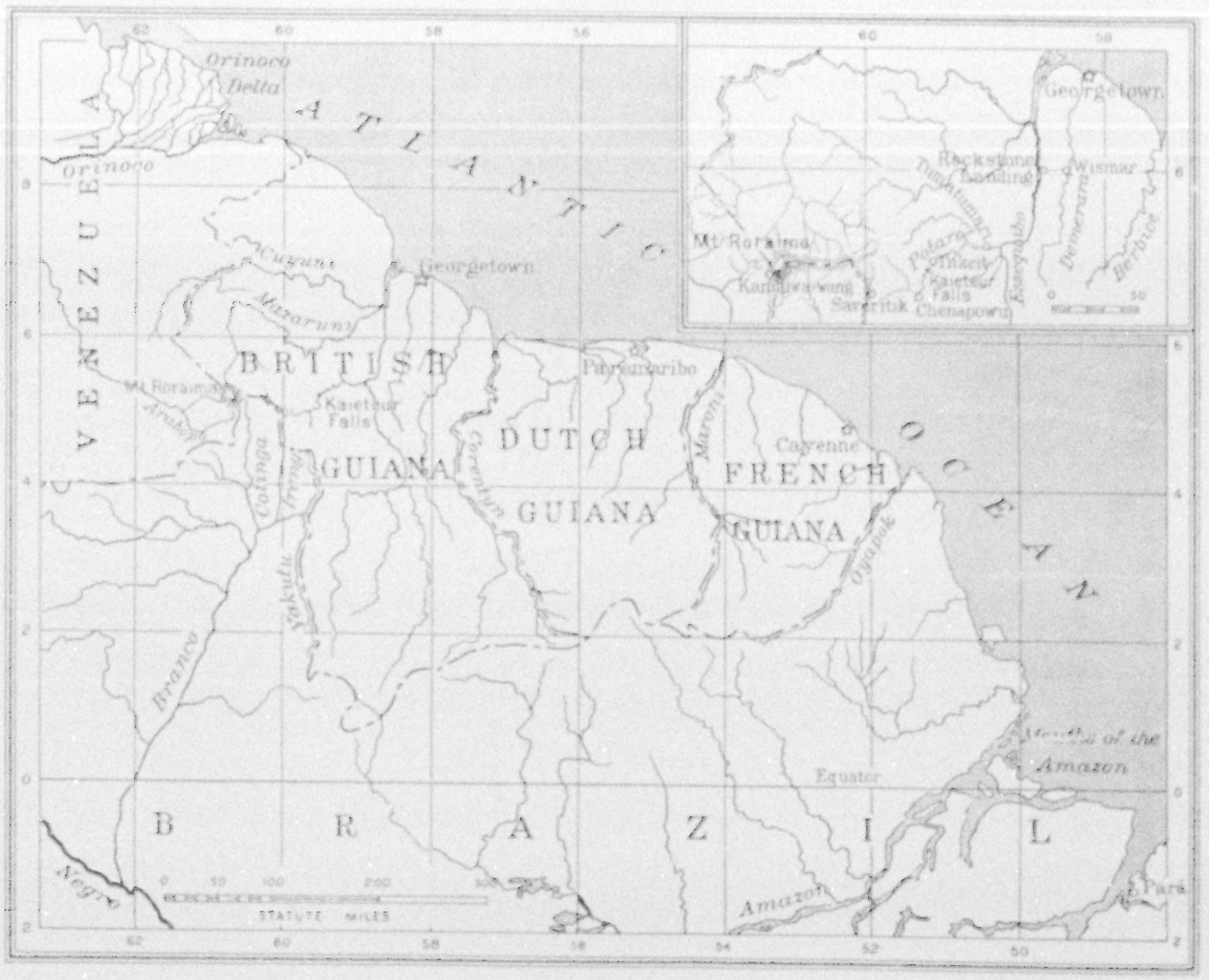
Miner and Frank E. Lutz, both of the Museum staff. Later, with Dr. Lutz, the journey was continued through Martinique and St. Lucia to Georgetown, the capital of British Guiana, which is situated at the mouth of the muddy Demerara River, whose waters far out at sea had indicated the near presence of the continent of mystery.

At this well-built and populous city many new-made friends gave us information and encouragement.

In securing data relative to equipment and lines of travel, we were told by those conversant with the "bush" that our projected route was impracticable, as far as the region between Kaieteur and Roraima was concerned; that twelve months would be required; that perhaps we could return in ten months, but that "we would come back dead!"

This was ominous, in view of the fact that an interval of little more than two months was available! Yet fortune favored, as it transpired, and my journey to Roraima and back was completed in exactly eight weeks.

It was on the 8th of July that we em-



Drawn by A. H. Bumstead

A MAP OF THE GUIANAS, WITH AN INSET SHOWING THE TERRITORY TRAVERSED BY THE "KAIETEUR AND RORAIMA" EXPEDITION

barked with our equipment and an invaluable Hindu servant, Raggoo, for the run of 65 miles south on the Demerara River to Wismar, from which a railroad took us across the flat plains of the alluvial coastal strip to Rockstone Landing, on the Essequibo River—our real point of departure into the interior.

The river was high above its bank and flowed ten feet deep about the pillars supporting the bungalow built here for the rest and recuperation of those coming out of the forests and for a last night of comfort for those making the break from civilization.

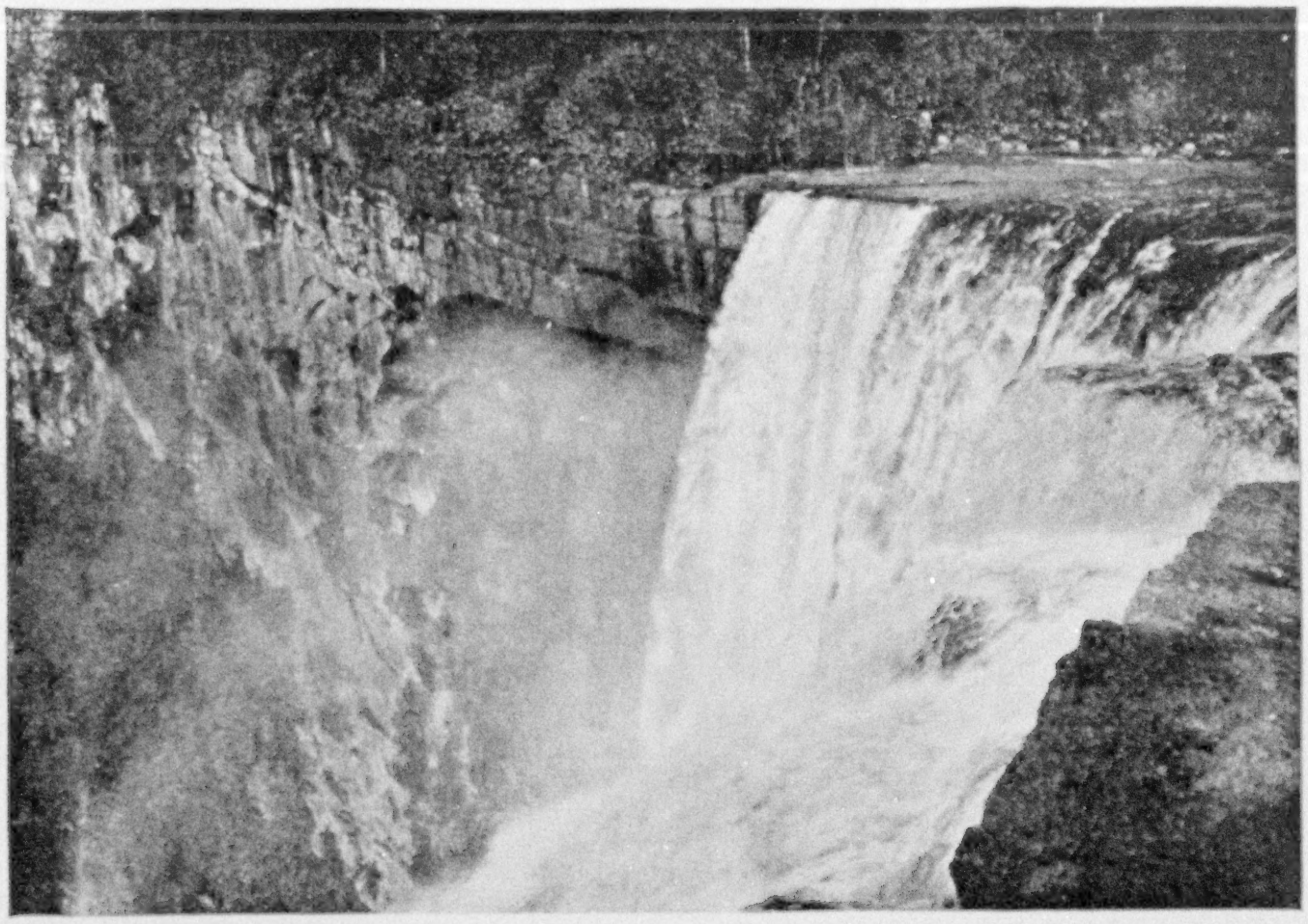
WEIRD NIGHT SOUNDS IN THE "BUSH"

All through the night, our first in the "bush," a chorus swelled from the throats of countless toads and frogs, each with its individual note of deep, booming bass or shrill, piping treble. The fish and alligators splashed in the waters about the house, many of the former falling prey to the servants, who dropped their lines from the convenient windows of the kitchen. Under the late full moon a boat or two of rubber collectors came toward the shore, singing their musical chanteys with rich and powerful voices.

It was a night which can never be forgotten.

The howling monkeys aroused us in the morning by their calls, as they came by families to drink and to bathe at the water's edge. Although one of them is no larger than a terrier, the bony flask at the throat enables it to magnify its call to a resonant roar that is quite the equal of a jaguar's at feeding time in the menagerie.

After a day of notable observation and collecting, the journey was resumed by a diminutive steamer, and night brought us to the cataracts of Tumatumari, 153 miles from Georgetown, on the Potaro River,



AT THE VERY RIM OF THE KAIETEUR FALLS ONE SEES THE WAY THE EDGE RECEDES
(SEE ALSO PLATE XIII)

The sill of rock breaks away in huge blocks so that a step is formed upon which the water dashes into spray before plunging below. The roar of the cataract can be heard for many miles. In the cavern behind the watery curtain, myriad swallows find shelter at night, winging their way home in the late afternoon after the day's flight about the country.

a branch of the Essequibo, where the hills about the river made a welcome and restful change from the low, unbroken levels of the coastward country.

In this region we met the first signs of Indian inhabitants, who are few and scattered and dwell mainly in the further interior. Here and there, on the borders of the river, a clearing had been made, where, among the stumps of the felled trees, the cassava or manioc plants were growing.

Now the days passed quickly. A still smaller launch conveyed us to Potaro Landing, where a carry, or portage, of seven miles across sandy roads and low-forested hills ended at Kangaruma, on the river above the Pakatuk Rapids.

From this point to Tukeit, in the Kaieteur Gorge, we traveled in heavily built river boats manned by Indians and negroes arrayed along the gunwales. Throughout the long day, with its alternating blistering heat and drenching showers, they wielded their small-sized paddles in a rhythm that was kept by crashing the handles of the paddles upon the boat's edge between successive strokes in the water. The result was a not unmusical effect, which called to memory the booming of the clubs on the hollow logs of distant Fiji.

THE GORGE OF KAIETEUR BEGINS 190 MILES FROM GEORGETOWN

So the carries at Amatuk and Waratuk were reached and passed. Not far beyond the latter, a little more than 190 miles from Georgetown, the river gave up its tortuous course and straightened out in the lower gorge of Kaieteur.

The sides now rose abruptly to more than a thousand feet above the placid water, in which the scene beyond was mirrored with almost photographic faithfulness. Even the white streak of the falls itself, many miles away, was displayed in the inverted picture. However,

A GROUP OF BEARERS AND ONE OF THE NATIVE BASKETS IN WHICH THEY CARRY THEIR BURDENS

The basket is borne upon the back. It is supported by bands of tough bark which pass over the shoulders and across the forehead. This is the noon hour and the toilers are making their midday meal of boiled rice and roasted meat.

many days of labor elapsed before we came to a close acquaintance with Kaieteur and completed the first stage of the memorable journey.

At Tukeit, four miles below the falls, the end of river-boating was reached, all the goods were landed, and two of the three Indians engaged at Kangaruma were dispatched to the further country for additional bearers, who would transport upon their backs the equipment for the journey to Roraima.

The burros of the Andes do not exist here, but if they did they would be unable to replace the human carriers, for only these can successfully traverse the steep places of the rough and narrow mountain trails.

AT THE BRINK OF THE FALLS

Then came the memorable day in mid July when I stood upon the brink of the great falls. Taking a small party of bearers with the provisions and the tarpaulin for a base camp on the plateau above and leaving Dr. Lutz to look after affairs at Tukeit, I made the ascent to the upper level and followed the roar of the waters to the edge of the gorge, from which an unimpeded view of Kaieteur was obtained.

The magnificence and impressiveness of the scene are immeasurably greater than words can convey. Over the red-brown cliffs at the head of the chasm (see Plate XIII) pours a vast sheet of water more than 800 feet in height—a white curtain all the more distinct because of the dark cavern hollowed behind it.

The waters pour down into the depths with a tremendous roar, to be heard for miles around, and the mists rise always in clouds that are striped with rainbow colors so distinct as to impress themselves upon the film of the camera. The breadth is 300 feet and more in time of flood, and the symmetry is wonderful—so perfect, indeed, that the huge scale of the whole scene is incomprehensible.

THE CARIBS, INTO WHOSE TERRITORY THE RORAIMA EXPEDITION PENETRATED, ARE SKILLFUL HUNTERS

Both the bows and arrows of these natives measure six feet and more in length. The clothing of the men consists of an abbreviated loin-cloth. The simple garment of the women is a small apron of white beads—the "lap" or "queyu"—depending from a cord about the waist.

The setting, also, is perfect; no signs of human habitation or human works mar the surroundings; all is wild nature at its best.

The geological details are no less interesting in themselves. The plateau everywhere is surfaced with a dense conglomerate bearing very little soil; so that, despite the heavy rains of the wet season, it affords poor holding ground for vegetation. In effect a rocky savanna, its characteristic plant inhabitants are a giant Bromeliad and an abundant sundew (*Drosera*), besides the grasses of the more favorable areas.

At the brink of the falls, from which marvelous views down the gorge unfold, the rock falls away in great blocks, sometimes leaving a step upon which the waters dash into foam before plunging into the depths below.

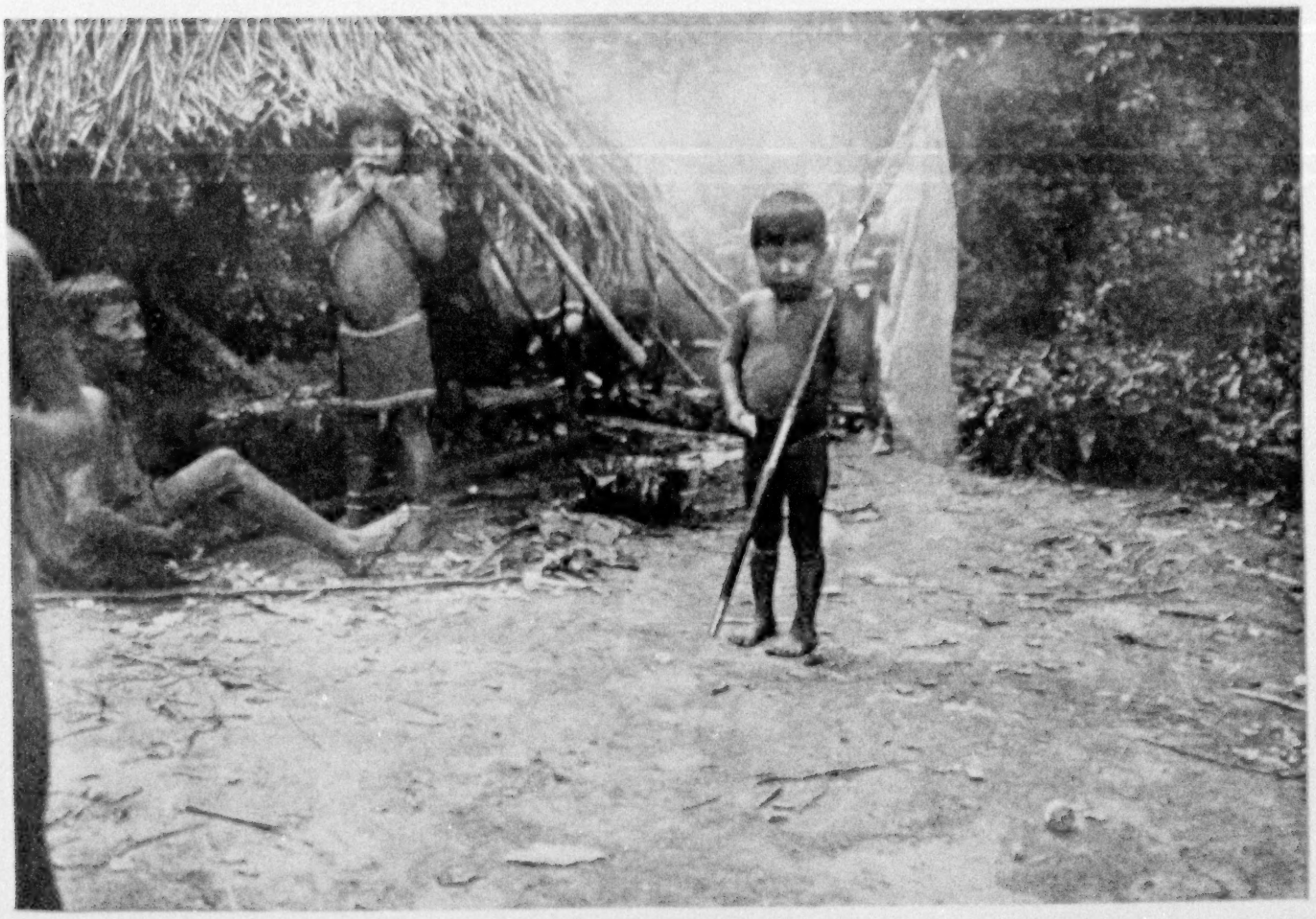
In the cavern behind the watery curtain immense flocks of swallows pass the night, winging their way back in the late afternoon from their day's flight about the country.

HOW THE EXPLORER SLEEPS IN THE BUSH

The base camp at Kaieteur was established a mile or so above the falls, near the margin of the upper Potaro River.

It was a simple and characteristic establishment. A rough framework of saplings supports a tarpaulin as a roof, but all sides are left entirely open. The ridge-pole rests at one end in the natural fork of a stout pole, while the other is held by a similar pole against a large tree. The edges of the canvas roof are laid over eaves-poles similarly supported and are held out and tied to slender sticks driven into the ground.

A camp bed is useless or worse; one sleeps in a wide hammock of Indian weave, slung from the ridge-pole. Poisonous snakes are far from uncommon and scorpions several inches long may be picked up from among the leaves and sticks beneath the hammock. The traveler soon forms the habit of shaking out



BORROWING AN INSECT NET, A YOUTHFUL VOLUNTEER AIDE ENDEAVORED TO ASSIST THE AUTHOR IN HIS COLLECTING

Note the little gold cross which the boy wears suspended from a thread about his neck. His parents procured it from a distant mission. Both he and his sister wear the bead and cotton-thread bands around the arm and leg.

his boots every morning to dislodge any of these creatures that may have entered during the night.

A cheese-cloth covering goes over the hammock, making a tent, into which one crawls by a hole in the bottom. The myriad insects and the vampire bats make this obligatory, although the attacks of the latter are not frequent.

Fires are kept going during the night, for rarely do the jaguars and pumas and other large cats—all called "tigers" in the bush—molest a camp with its fires burning.

A few days later the Indian messengers returned with eleven others whom they had persuaded to enter my service. They were an interesting and picturesque group, strong and well formed, for the hunting had been good and their cassava fields were flourishing.

The men wore abbreviated loin-cloths, and the simple garment of the one elderly woman was the small apron of white beads—the "lap," or "queyu"—depending from a cord about the waist. They were all Caribs and members of the Patamona division of the Ackawoi tribe, into whose ancient territory we had penetrated.

THE NATIVES WITHHOLD THEIR REAL NAMES FROM STRANGERS

At first the newcomers were very shy, but ere long cordial relations had been established and they proved to be children, like all primitive peoples.

Each bore a "mission name," such as Joseph, or Albert, and even Chamberlain, given by a missionary or trader. The native name is not imparted to the traveler until a real friendship is formed, for they believe that knowledge of this enables an ill-wisher to do them harm by sorcery.

They cheerfully began the transport of our equipment from Tukeit to the higher camp, but so steep was the trail, scarcely five miles in length, that only one load could be brought up in a day. The bur-

AN INDIAN WOMAN AND HER DAUGHTER BAKING CAKES OF CASSAVA

These broad, flat cakes are made from the starchy pulp of the manioc plant washed free of the poisonous juices of the fresh material. The interior equipment of the Indian huts in British Guiana is extremely primitive.

den was carried in the typical basket borne upon the back and supported by bands of tough bark which pass over the shoulders and across the forehead.

The carriers would reach the camp about noon and receive their stipulated ration sitting about the little fire, over which they boiled the rice and roasted the meat. Then, chatting and laughing, they would depart to Tukeit, to repeat the climb on the morrow.

One memorable night I had sent every one down and remained alone. It was this particular time that was chosen by a jaguar to stalk and rush a tapir, and both of the animals plunged through the forest a few yards from my hammock. Of course, one always sleeps with fire-arms within reach, for many things may befall in those wilds.

With the last of the loads, a week later, Dr. Lutz came up and final preparations were made for further progress. Long before this the enforced decision had been made to leave my colleague here and to venture on without him.

Heavy rains and vexatious delays had reduced the available time, so that the remainder of the projected trip needed to be made in rapid order, if at all; and ordinarily two white men cannot travel as fast as one, because the doubled chances of illness must be taken into account.

So the goods were put aboard the wooden punt, which my Indians had brought down from an abandoned plantation up the river, as well as on the wooden dug-outs, or "corials," and the still more primitive "wood-skins." The last named are merely lengths of bark from a large forest tree, which have the ends brought up by cross-sticks, so as to give a freeboard of three or four inches; yet a hundred pounds of freight and two Indians can be supported by such a frail craft.

Waving farewells to Dr. Lutz, as he stood on the bank with the Indian man and two boys left with him, our little flotilla passed around a bend of the river toward the unknown experiences of the future.

High forests came down to the very edge of the water, and the trees were so festooned with vines or "lianas" as to constitute a veritable wall, which re-echoed the crash of the paddles on the gunwales of the boats, as from a cliff of rock.

Thirty miles of hard paddling against the swollen current of the upper Potaro River brought us, after three days, to Chenapowu, a region of widely scattered Indian settlements consisting of one or two huts at the most.

At Chenapowu began the long walk, for the projected route to Roraima trended due west, at right angles to the smaller streams of Guiana and the larger northern tributaries of the Amazon.

More than a hundred miles through almost trackless country lay between us and the mountain, and although the distance itself was not long, yet the difficulties to be met rendered it far greater in experience.

In preparation for the long march the equipment was slightly reduced in bulk and the bearers were increased to twenty-five, and soon we filed off into the heavy forests that intervened between Chenapowu and the Brazilian border.

STUMBLING THROUGH THE JUNGLE

It is impossible adequately to describe the arduous journeys of the next five days. Every day, about the time of starting from the temporary camp of the night, the sky clouded and the rain poured down on the dense tree-tops, which formed a veritable canopy to collect the waters and to pour them in streams upon the stumbling travelers beneath.

In the deep gloom the feet caught on the interlaced roots of the trees, which, unable to enter the hard ground, ramified like traps under the thick wet cover of fallen leaves.

The eye searched the ground for the little deadly labarria and the "bushmaster" (a worthy rival of the king cobra in strength and venom), which so closely resemble in coloration the dark-blotched earth that the closest scrutiny of the line of travel must be incessantly kept.

Up steep slopes of 500 feet or more, clinging to the bushes, and down gullies, where the swollen streams must be forded waist and shoulder deep, day after day, the human wayfarers struggled on to-

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EMERGING UPON THE GRASSY SAVANNAS ON THE BORDER OF BRAZIL, AFTER MANY WEARY MILES OF TOIL THROUGH THE GLOOM OF TROPICAL FORESTS

The native porters are able to travel much faster over these rolling plains than in the bush. At the first light of day fires are kindled for the early meal, the loads are apportioned among the bearers, and brisk progress is made during the coolness of the dawn.

ward the settlement of Saveritik, near the Chimepir Creek, at the border.

On one of these days, after seven hours of hard work, progress of only five miles had been made.

But it was the psychological effect of the whole combination of circumstances—fatigue, wet clothing and body, and the strain of the senses—that seemed to me most trying. The jungles of the tropics were no novelty, for I had made several journeys of exploration in the islands of Polynesia, but nowhere else have I experienced that deadened sensation, as though the personality of thought had been completely crushed and the body had become a mere automatic machine.

One comes to understand why the people of the region have a saying to the effect that a person lost in the bush for only a day and subsequently discovered "leaves his mind behind him."

So the camps for the night and the noonday halts were made at the waters of the Tururaparu, Wung, Murepang, Uliparu, and Kopinanang, streams that were crossed at right angles, as they flowed northward into the Potaro or southward from the Kamana Mountain divide. At the Kopinanang, and from that to the Guiana shore of the Ireng River, Indian settlements of one or two huts were found and many interesting incidents befell.

THE CASSAVA CEREMONY OF HOSPITALITY

In one village I participated in the cassava ceremony of hospitality. When a strange party comes to a hut or settlement, the home of the head-man is sought at once, burdens are set down, and the host grunts in alternation to disjointed statements by the newcomer relating to his journey. Then the host becomes the speaker, and the stranger grunts his comments, conveying many shades of meaning by inflections and tones.

Cakes of cassava are ordered out, together with a "buck-pot," or clay bowl filled with pepper infusions; the visitors in turn dip a fragment of bread in the pepper, eat it, and then general conversation is in order. A sure indication of the degree of friendliness is afforded by the promptitude with which the ceremonial is ordered.

At length the head of the Chimepir was reached, and the vision ranged out over the dense canopy of the forest tops to the cloud-filled valley of the Ireng River, a northern branch of the Amazon system, which separates Guiana and Brazil. A day later we reached the three huts of Saveritik, now situated on the river itself.

Natives from other places up and down the stream flocked to my camp and seated themselves in rows to observe every act and movement of the stranger in their midst. While I was averse to parting with the "barter,"—beads, powder and shot, and cloth—wishing to conserve the goods for use beyond, they made me small "presents" of food and baskets, for which I was forced to bestow "gifts" in return.

This place remains memorable because here a critical decision had to be made, fortunately without a disastrous outcome. The hard and slow traveling across country had cut down time and supplies to an unsafe degree; not enough of the latter remained to support the party during the journey to Roraima and back to this point, even under the most favorable conditions.

Either I would cross into Brazil, explore the savannas, and return without attempting the journey to the famous mountain, or else, with insufficient food, I would start for Roraima, hoping to obtain some supplies from Indians at some point.

The second alternative was finally chosen. A few bucks were detached, while others were sent back to Chenapowu for some of the food left there, to await our return to Saveritik. Finally, with the bearers reduced to seventeen, the passage of the Ireng was made in very doubtful "corials," and I set foot on the soil of Brazil—the land which possesses so great a charm and lure for the naturalist.

A full half day was required for the toilsome climb of 1,500 feet through the forests covering what is, so to speak, the huge beveled edge of this part of Brazil. Then, at a point midway between Mt. Elidik and Achimatipu, we emerged upon the wide grassy savannas, open and sun-drenched, one sight of which revived and

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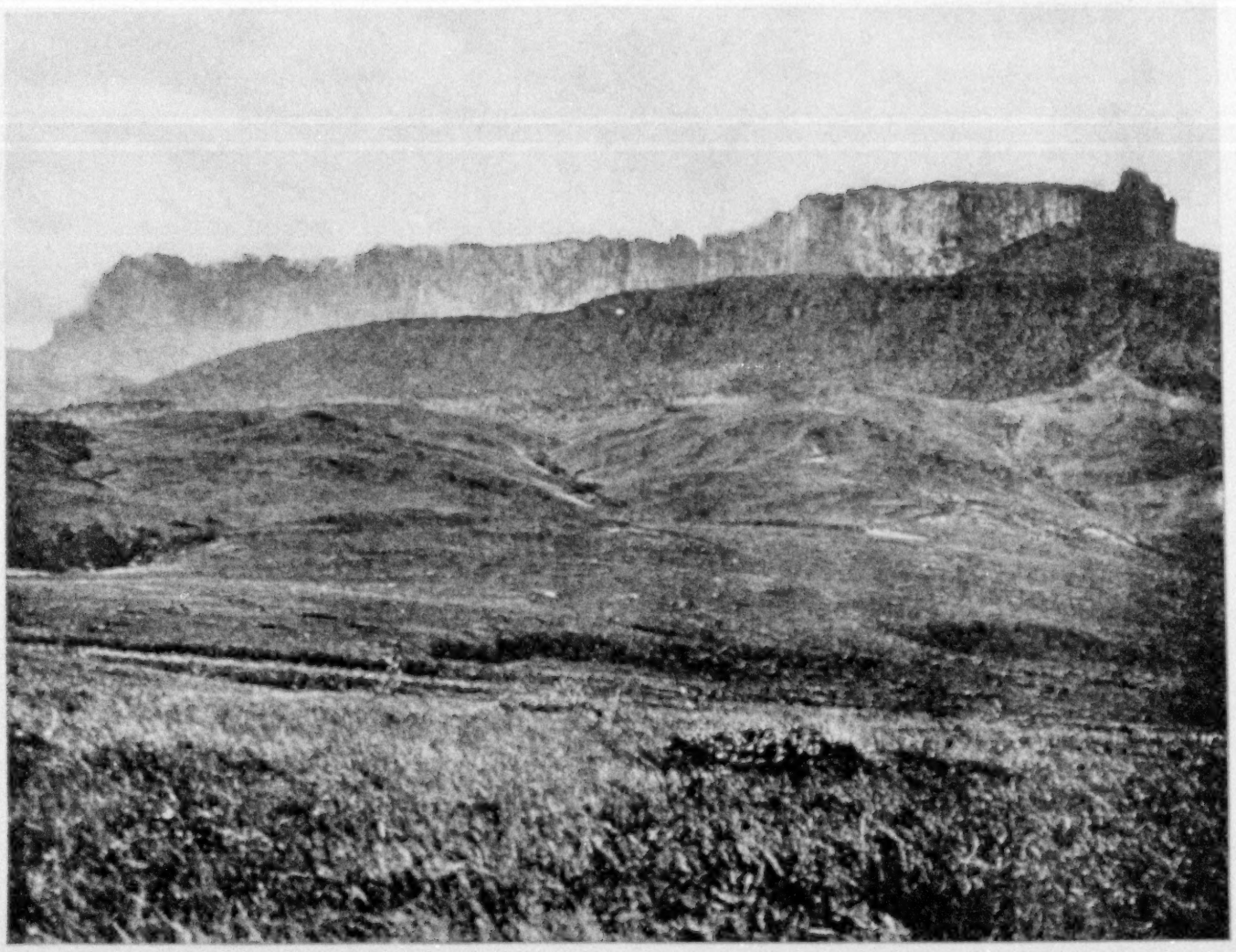


RORAIMA, THE GREAT FLAT-TOPPED MOUNTAIN NINE MILES LONG AND THREE MILES WIDE, RISES LIKE A VAST BATTLEMENT CONSTRUCTED BY TITANIC NATURE

The southwest face affords the only practicable way of ascent. About one-quarter of the distance from left to right (west to east) an oblique series of ledges makes it possible to reach the summit, a task first accomplished in 1884 by Sir Everard im Thurn. On the east the waters from innumerable silvery falls flow into the rivers of Guiana, southward they enter the branches of the Amazon, while on the southwest they run into the wide-circling tributaries of the Orinoco.

stimulated the mind, which had been so long depressed by the gloom of the forests.

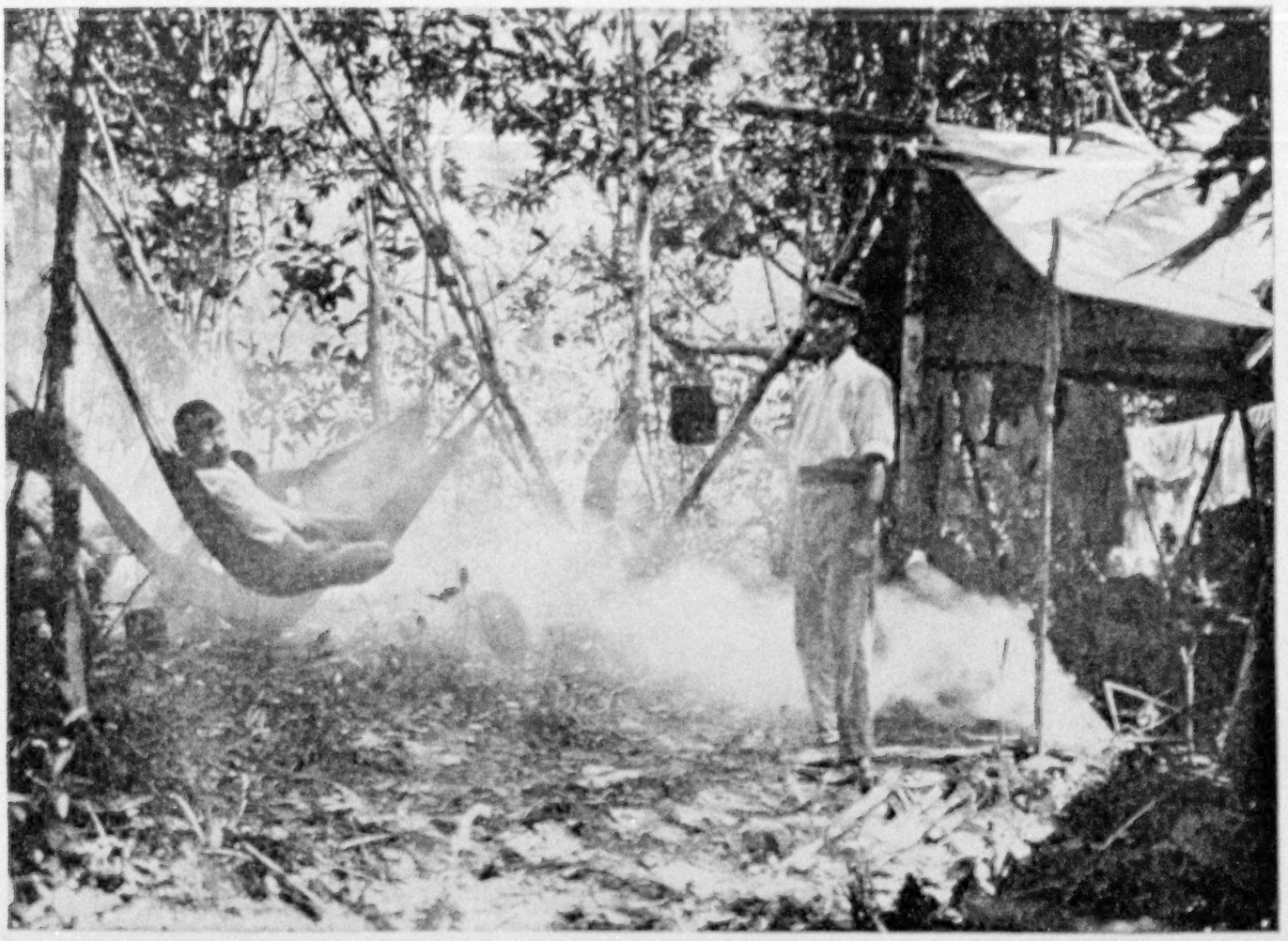
The trees grow only in patches and tongues along the hollows, where for a time the copious rains remain; elsewhere the rolling plains are covered with green grass of somewhat sparse growth save in the gullies, for the old, time-aged gray or reddish soil of this area holds the water for only a brief time.

Travel was faster now. Terrace by terrace the land rose to an altitude of 4,700 feet, and now and again, as at the Karanang and Wailang Rivers, it was necessary to cross the hollows of smaller tributaries of the great Amazonian waterway. At last the high table-land of Roraima was sighted from a high point on the eastern crest of the Cotinga (Kwating) River valley, at a distance which robbed it of its impressiveness when viewed from a nearer place.

THE CARRIERS FEAST ON ANTS AND GRASSHOPPERS

Life upon the savannas differed in many ways from that in the forests. At the first light of day the fires would be kindled for the early meal, the loads would be apportioned to the bearers, and brisk progress would be made for a time in the relative coolness of the dawn in these higher altitudes.

Among the bright flowers of the plains myriads of basket-like spider webs glistened with the dew. Hundreds of the gray dome-nests of termites could be seen from any hillock, with here and there an earthen-colored mound fresh



AT THE EVENING CAMP THE NATIVES SWUNG THEIR HAMMOCKS IN THE SMOKE FROM THE FIRES

This expedient was adopted to drive away the myriads of sand-flies that were a torture during the day.

built by termites of another species. Such a "find" was welcome indeed to the bearers, who tore it open and eagerly devoured the softer-bodied inhabitants as they swarmed out of the broken galleries.

The huge grasshoppers of the plains also were greatly enjoyed by the Indians, although to me their interest was of another kind.

As the day wore on, the heat became intense, and at the noon camp every available shelter was employed as a protection from the direct rays of the sun. Then, too, myriads of minute black flies attacked the human wayfarers, marking each bite with a drop of blood, and their tortures continued until the smoke of the camp fires at dusk rid us of their presence.

An occasional snake was seen, usually a rattlesnake, disturbed by the sticks of the foremost Indians of the single file, continually beating the grass.

In every way—botanically, zoologically, and geologically—there was the sharpest contrast to the thick forests through which we had previously passed; only in an occasional clump of trees in a hollow or along the borders of a river—a forest in a grassy sea—did the Guiana butterflies and plants disclose themselves.

On the same day of the first sight of Roraima a long march brought us to a place mapped as Parmak, near the Cotinga River, but Parmak had vanished! The hundreds of natives had moved away and only one "banaboo" remained, whose younger inhabitants darted into the near-by woods on seeing a white man for the first time.

We had hoped for a comfortable night's rest in hammocks slung under roofs of thatch, but instead we were forced to make a camp by torchlight in the dripping forest, utterly tired out from the fifteen miles of travel under the blazing sun.

XUM

THE ARECUNAS AT KAMAIWA-WONG

The harvest had been good, and their hunting had been successfully accomplished with bows and arrows and blow-guns. Yet with the failure of the rains shortly after this photograph was made, severe famine resulted and half of the tribe perished.

Apprehension also added its weight, for the remaining provisions were sufficient only to last us back to Saveritik, should we turn back, and no food was obtainable here. To go forward meant we must continue westward until supplies were found.

But the morrow brought its cheer with the discovery of a volunteer guide who knew a way to Roraima shorter by two days than the route known to geographers.

With fresh courage we crossed the Cotinga, a river of great beauty, as it winds southward through the plains on its way to the Branco, and worked our way up a wide lateral valley toward Mount Weitipu, which stands like a sentinel guarding the approach to Roraima from the southeast.

RORAIMA IS REACHED

At last, in mid August, I reached Roraima. From the camp on Erkui Creek, on the west flank of Weitipu, we proceeded to the Arabopo River, an upper branch belonging to the Orinoco system, climbed over an intervening plateau, 4,500 feet in altitude, and halted on its farther border to gaze on the impressive scene before us. Fifteen hundred feet below spread a wide, undulating plain that rolled up to the forested zone at the foot of Roraima, only a few miles distant.

The flat-topped mountain, which is nine miles long and three miles wide, presented us its southern point and rose like a vast battlement constructed by titanic nature. Upon its sheer walls 2,000 feet without a break, that rise to a height of 8,600 feet, gleamed silvery threads of waterfalls that form the beginnings of streams entering the ocean at far-distant points.

On the east the waters flow into the rivers of Guiana, southward they enter the branches of the Amazon, while on the southwest they run into the wide-circling tributaries of the Orinoco system. Here, on Roraima, these widely diverging streams have their common origin.

With our end almost attained, we climbed down the valley and proceeded toward the village of Kamaiwa-wong, situated just south of the cleft between Roraima and Kukenaam, a sister mountain which is scarcely less impressive than the more famous height.

Here resided a numerous tribe of Arecuna natives under the sway of a powerful chief, whose "mission name" was Jeremiah. But two trivial incidents prevented our arrival at the village that night. Had it been otherwise serious trouble might have been encountered, although not until a subsequent time did I understand fully the critical nature of our position.

One circumstance was the hunt of a huge ant-bear and the delay occasioned by its killing. The bearers at the head of the line halted and pointed out the animal, as it shambled along from hillock to hillock.

As I crept up, gun in hand, the animal continued to feed, ignorant of my presence; whereupon I slipped the gun back into its holster and took out my camera. Setting it at twenty-five feet, I approached near enough to secure a much-prized photograph before the creature took alarm and bolted. It was run down and shot, enabling us to obtain an exact measurement of its length, which was six feet and six inches.

This animal (*Myrmecophaga jubata*) is extraordinarily interesting, as it feeds exclusively upon ants. It is covered with coarse, wiry hair of dull fawn and black, while its tail bears a heavy bush of longer growth; so that at rest the animal resembles a heap of dead grass. The head is slender and tapers gradually to a small end, where the diminutive mouth opens to allow a long, sticky tongue to be protruded.

The creature shambles along, from one to another of the myriads of ant-nests scattered over the savanna, tearing open the earthy galleries with the huge recurved claws of the forefeet. When the ants run out they adhere to the snaky tongue, which darts here and there, collecting a mouthful of the small creatures, which must be eaten in enormous numbers in order to nourish the great bulk of the ant-eater.

The second chance factor was a drenching downpour that overtook us when a mile short of Kamaiwa-wong, and so I decided to camp at once in a patch of forest on the Kauwa Creek, at the very foot of the great mountain.

As the memory of that night returns I

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A CHANCE KILL OF A DEER ON THE RETURN TRIP FROM RORAIMA WHEN SUPPLIES WERE LOW

The hunter is tying up the animal to be carried until the night's camp is made. The journey from the base camp at Kaieteur Falls to the great mountain and return was accomplished in four weeks, with only one day's provisions remaining at the end of the trip.

recall the conflict of many diverse emotions. Satisfied to have reached the end in view, with the "biological traverse" completed, yet I was somewhat apprehensive of what might happen before the return journey could be safely ended.

The Indian bearers had become greatly weakened by the ardors of the trip and also through the effects of the severe influenza, known as the "Brazil cold," which every newcomer contracts. They could carry only the most needful things, including the new supplies of food that we expected to obtain from the Arecunas of Kamaiwa-wong on the morrow. The return must be made without any untoward hindrances or setbacks, if we were to reach home in safety. Other dangers were fortunately unknown to me at the time.

With bitter disappointment, having considered all the elements in the situation, I determined to forego the attempt to reach the summit of Roraima, and to turn back after a single day of biological study and association with the Indians of the locality. Sir Everard im Thurn and others had described the top of the mountain, and my own personal desire to view the scene from the crest was less important than the scientific studies for which the journey had been projected. Yet it was a hard decision to make.

The next day was eventful indeed. Some of my bearers had gone to the village on the previous evening and had apprised the chief of my arrival. They also learned that an American missionary had died here some two weeks previously, under circumstances that to them, at least, had seemed suspicious.

Warned by Jeremiah to say nothing to me of that sad event, as he believed that he and his tribe would be blamed by me, nothing was told me of the occurrence. Every injury and death is attributed by these people to "kenaima" work, or sorcery, and they believed that the white man's death would be laid to them, although from what was learned subsequently a tribe to the north was perhaps more accountable, if, indeed, the unfortunate man's death was due to other than natural causes.

When, with four or five of my bearers, I approached the village in the early morning, no one stood forth to greet me. The Arecunas, clustered about their huts, stolidly awaited events. I asked for Jeremiah's house, but my interpreter said, "Me no sabe"—in effect a refusal to tell me.

I singled out the largest "banaboo" and approached it; whereupon the old man emerged with his sons and stood silently before us. His failure to order the cassava ceremony of welcome seemed strange and, at the time, unintelligible. But the situation had to be met; association elsewhere with primitive peoples had taught me that they are all children of a larger growth, to be humored as such.

First, I shook hands with all the natives, now standing in a great half-circle, and, as if by inadvertence, a second round was begun, which amused them to a degree; but still the cassava was not forthcoming, and something more was needful.

A DANCE SAVES THE DAY

By some process of thought, it occurred to me to dance a few steps of the simple "paiwari" dance of their carouses, which I had learned from the Guiana bucks.

The sight of the bearded, spectacled, and khaki-clad stranger solemnly performing in such a manner was too much for their sense of humor. Soon all were laughing and chatting. Jeremiah unbent to a degree, the cassava was ordered out, and all was well.

The remainder of the morning passed off without any really untoward incident. Here some fresh supplies of cassava bread were secured for our return journey, and here also I bartered powder and shot, fish-hooks and pins and cloth for specimens of their basketry, bows and arrows, and blow-guns, which the people used with tiny arrows poisoned with the deadly curare.

Many of the natives trooped back to my camp to see what the traveler might have for which they could trade.

During the days that followed the panorama of the upward march unrolled before us in reverse order. One night an Arecuna of Kamaiwa-wong became extremely ill—why I do not know, unless he had been meddling with my cyanide

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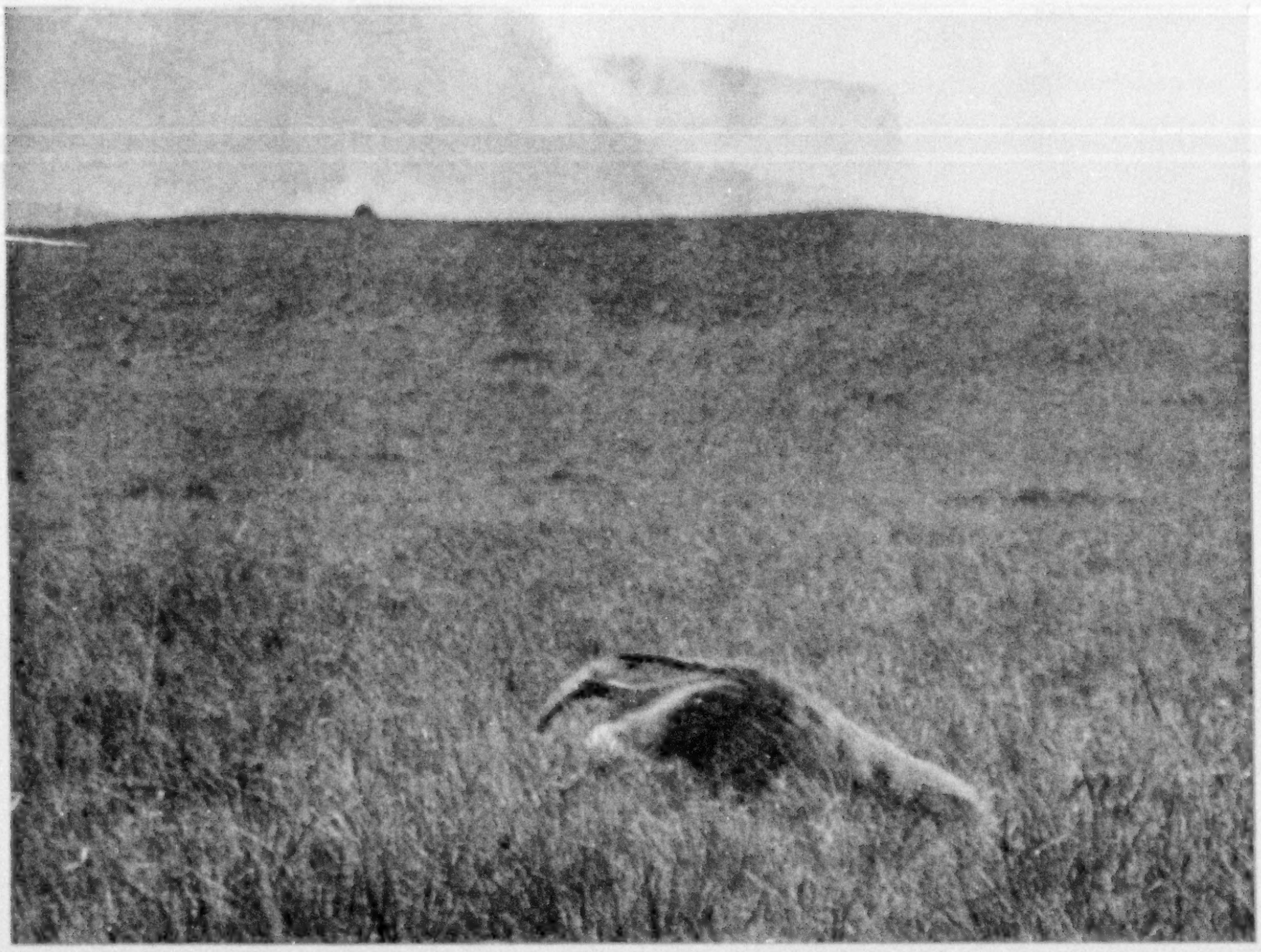


ON THE OPEN PLAINS, WITH THE GREAT BULK OF RORAIMA IN THE DISTANCE, AN ANT-BEAR WAS SIGHTED

By creeping up silently a photograph was secured at a distance of 25 feet, before the animal took alarm and bolted. It was killed and proved to be six feet six inches in length (see text, page 241).

jars—and the word passed around that I was compassing his death by "kenaima"-work, in reprisal for the missionary's death: and in this judgment my own bucks acquiesced.

Fortunately—for me—the victim did not die until after we had broken camp and were upon our way the next morning.

At Parmak also a somewhat critical incident occurred, when Chief David and a dozen of his tribe, who had heard of my presence in the neighborhood, intercepted us for the purpose of bartering.

Owing to the weakness of the bearers, it seemed unwise to add another pound to their burdens, and I declined to trade. David became enraged and handled his knife so ominously that I was quick to bestow "gifts" upon him and his crew.

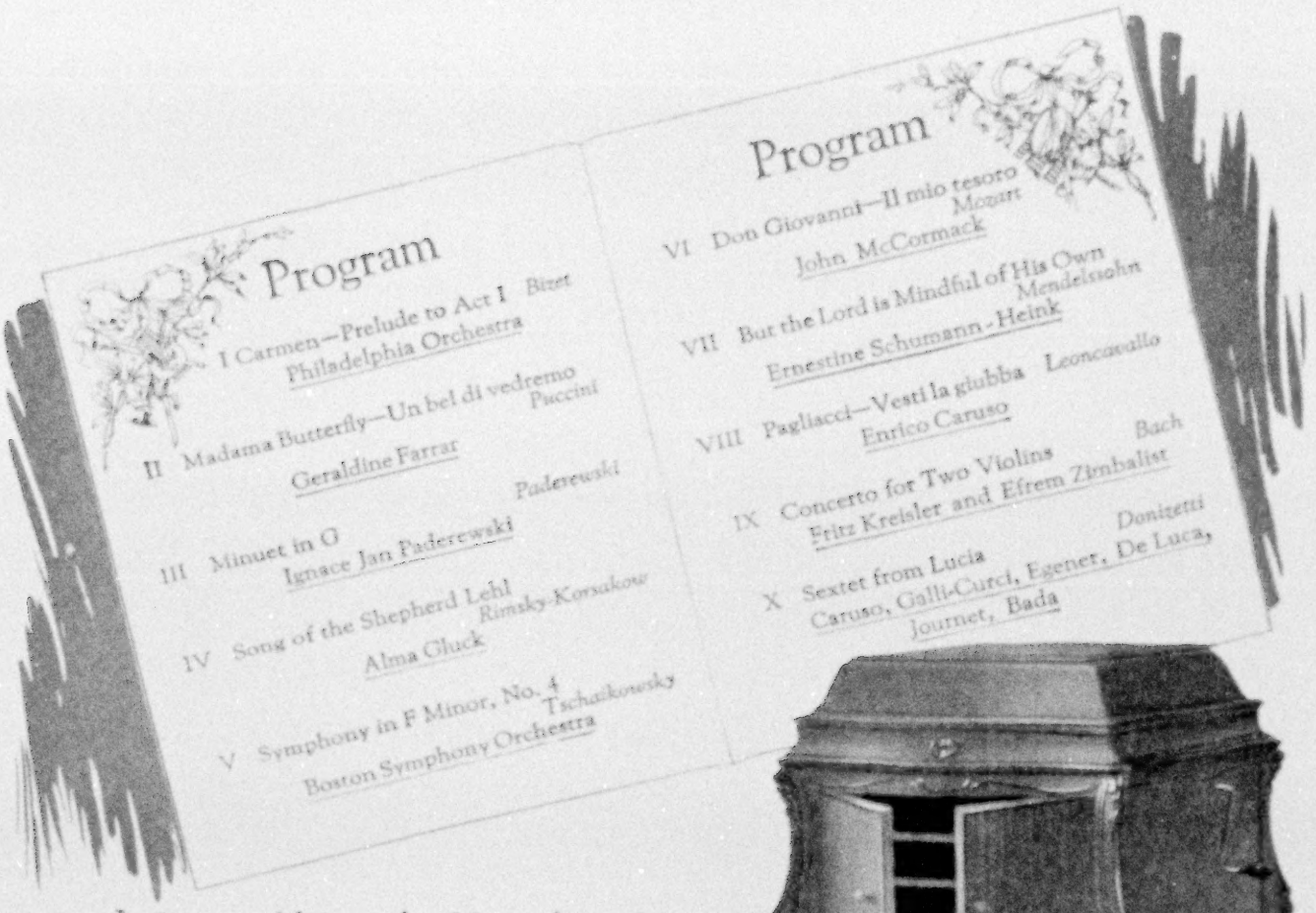
Food supplies were dangerously low, and the chance kill of a deer was an incident that put us all in better humor.

A last look at the rolling savannas of the Brazilian border, a plunge down the slopes to Guiana, a series of forced marches to Chenapowu, and a day on the upper Potaro brought us within sound of Kaieteur Falls and to the base camp, from which Dr. Lutz had departed shortly before, according to our plans.

Four weeks to a day had elapsed since the start from this place for the further interior, and in this time the trip had been made despite the many obstacles and delays. Only one day's provisions remained.

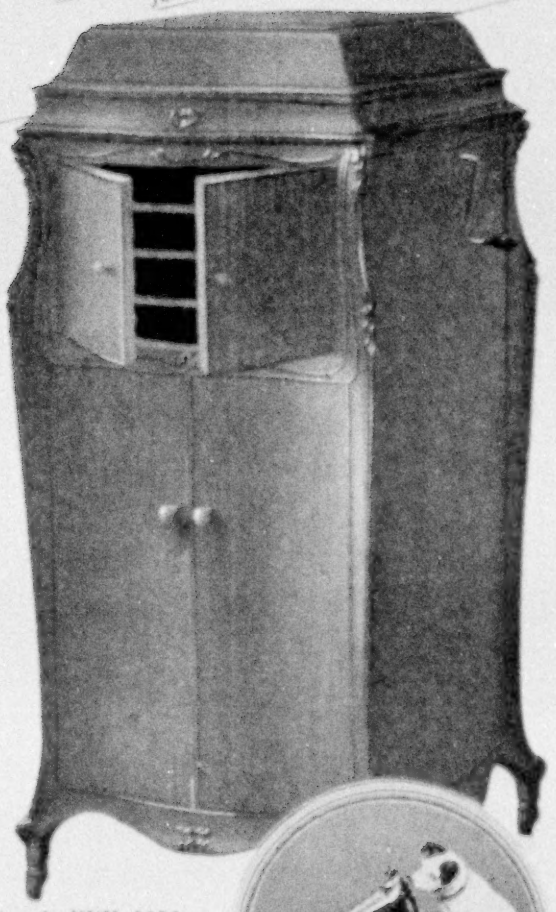
I reached Georgetown after an absence of eight weeks, and through the courtesy of the Hon. J. J. Nunan an account of the journey and of its general scientific results was given before the Scientific Society of Georgetown—the closing event of a series of varied experiences that will always remain clear and distinct in memory.

Look at this for a program!



It is possible on the Victrola only! For only with Victor Records on the Victrola do you get the subtle shades of color, tone, and interpretation which mean pre-eminence. When you hear Victor Records *played on the Victrola*, you hear precisely what each artist heard and approved as his or her own work. Any other combination must necessarily be less than the best.

Be sure you get *a Victrola* and not an imitation. $25 to $1500. Victor dealers everywhere. New Victor Records demonstrated at all dealers on the 1st of each month.



VICTROLA

REG. U. S. PAT. OFF.

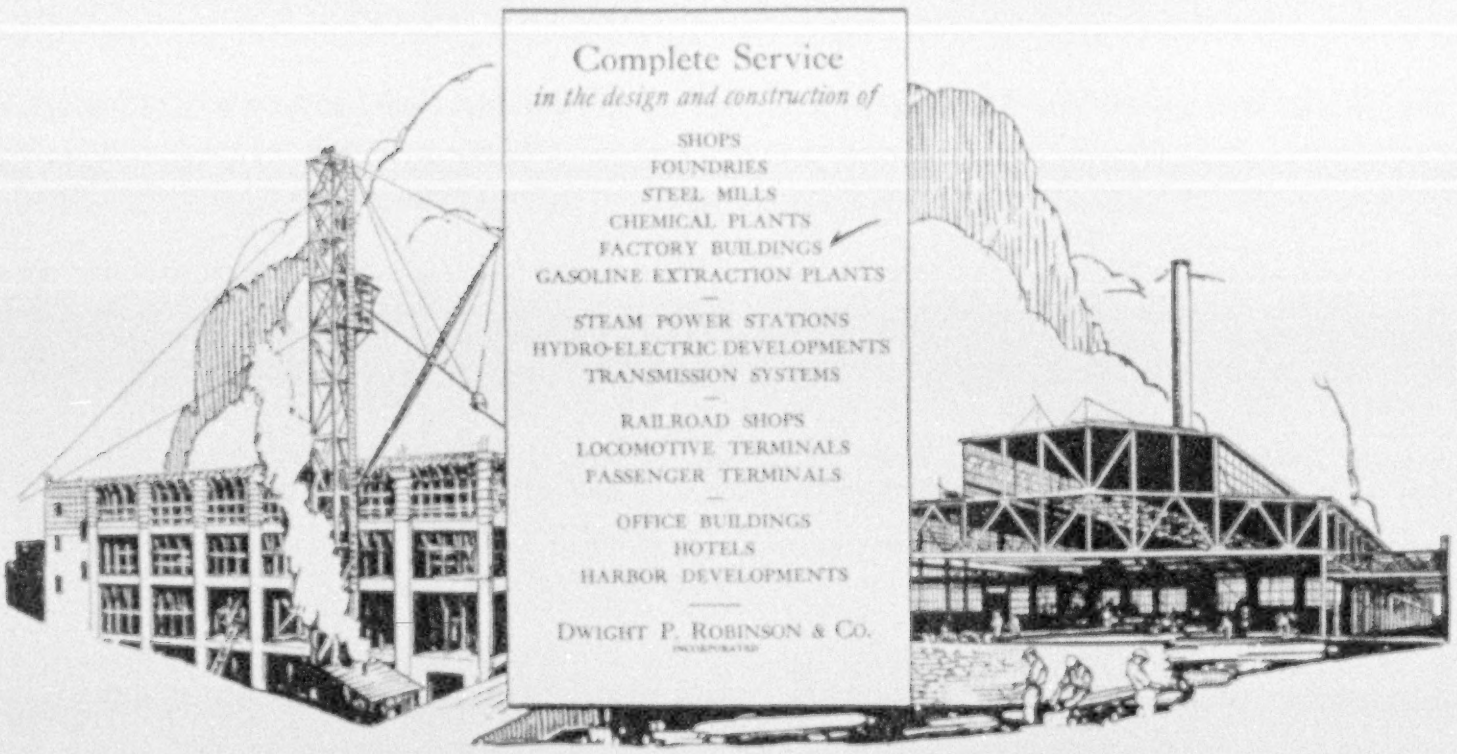
Victrola XVII, $350
Victrola XVII, electric, $415
Mahogany or oak

Victor Talking Machine Co.

Camden, New Jersey

This trademark and the trademarked word "Victrola" identify all our products. Look under the lid! Look on the label!

VICTOR TALKING MACHINE CO.
Camden, N. J.



FACTORIES

If you are thinking about factory construction you may be confronted with many problems. Shall the building be of reinforced concrete or steel frame? If the latter, what walls shall be used? What type of construction is the best for a particular purpose? Can more efficient routing and handling methods be provided in the new building?

Let us help you with your problems. We are specialists in *all* types of construction, and our advice is based on long experience in the design and construction of a wide variety of industrial plants of reinforced concrete, steel and mill construction.

We offer a complete service including design, construction and installation of equipment, or we will construct from the plans of other engineers. If you contemplate construction of any character we would like to discuss it with you.

DWIGHT P. ROBINSON & COMPANY
INCORPORATED

Engineers and Constructors

125 East 46th St., New York

CHICAGO PITTSBURGH CLEVELAND DALLAS

Consolidated with WESTINGHOUSE, CHURCH, KERR & COMPANY, Inc.

Investors' Harvest

ONLY to those who plant good seed in tested soil can harvest time bring full yield. An investor's harvest at each interest and dividend date is best assured through the purchase of high-grade securities which stand the test of critical examination.

Let us help you select income-yielding securities to fit your needs. Use our nation-wide organization, with its 50 offices, its great investigation and research department, its years of experience.

Particularly fine opportunities appear on our current purchase sheet—send for it. Ask for AN 138.

The National City Company

National City Bank Building, New York

Facts for
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OUR book "Men and Bonds," giving information on the following subjects, will be sent gladly on request:

Why we handle only carefully investigated investment securities.

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How 10,000 miles of National City Company's private wires keep our offices in leading investment centers of the country in constant touch with our New York headquarters.

Your advantage in dealing with a Company whose representatives talk with an average of 3,000 banks a day.

Why these sales representatives are especially qualified to helpfully discuss your individual investment needs.

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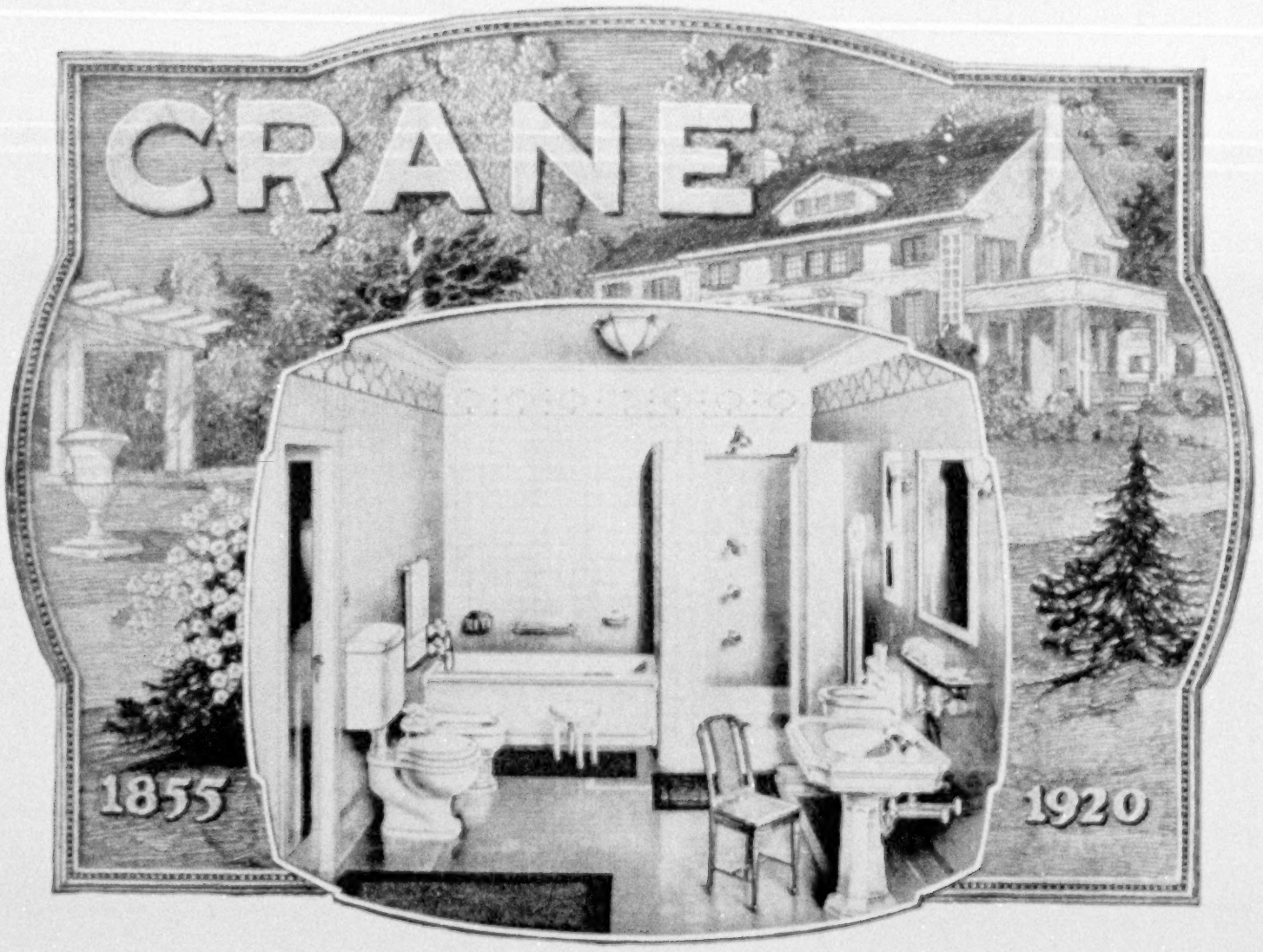
BONDS
PREFERRED STOCKS
ACCEPTANCES

THE NATIONAL CITY COMPANY
NATIONAL CITY BANK BUILDING
NEW YORK



Crane Service is as Broad as the Market

Specifying Crane equipment for a heating or plumbing installation insures high quality and serviceability not only in the visible fittings, but also in the hidden piping, where lack of reliability might soon jeopardize the whole system.

This standard of service is equally important whether the builder is interested in a home, hotel, apartment, office building, factory, hospital or other public institution. It is equally easy to obtain, too, for buildings of all sizes and types, because the Crane source of supply is as broad as the market.

In addition to providing, through the trade, proper fixtures for every requirement of heating, plumbing and sanitation, Crane Service gives ample choice of design to satisfy individual tastes.

We are manufacturers of about 20,000 articles, including valves, pipe fittings and steam specialties, made of brass, iron, ferrosteel, cast steel and forged steel, in all sizes, for all pressures and all purposes and are distributors of pipe, heating and plumbing materials.

THERE IS A NEARBY CRANE BRANCH TO GIVE YOU CRANE SERVICE

CRANE CO.

836 S. MICHIGAN AVE. CHICAGO

VALVES-PIPE FITTINGS-SANITARY FIXTURES

CRANE EXHIBIT ROOMS

23 WEST 44TH ST., AND 22 WEST 45TH ST., NEW YORK CITY

TO WHICH THE PUBLIC IS CORDIALLY INVITED

BRANCHES: FIFTY-SEVEN LEADING CITIES - WORKS: CHICAGO, BRIDGEPORT

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MEMPHIS
LITTLE ROCK
MUSKOGEE
TULSA
OKLAHOMA CITY
WICHITA
ST. LOUIS
KANSAS CITY
TERRE HAUTE
CINCINNATI
INDIANAPOLIS
DETROIT
CHICAGO
ROCKFORD
OSHKOSH
GRAND RAPIDS

ST. PAUL
MINNEAPOLIS
DULUTH
FARGO
SACRAMENTO
OAKLAND
SAN FRANCISCO
WATERTOWN
LOS ANGELES
DAVENPORT
DES MOINES
OMAHA
SIOUX CITY
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BALTIMORE
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ALBANY
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BUFFALO
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GREAT FALLS
BILLINGS
SPOKANE
SEATTLE
TACOMA

That the demands of industry are as fully met by Crane Service as those of the homebuilder is strikingly indicated by the accompanying photo of Crane steel elbows and manifolds. Compare their size with the figure of the worker.

COLGATE'S
RIBBON DENTAL CREAM

REG. U. S. PAT. OFF.

There are three ways to clean your teeth

1. You can scour off food particles with a gritty dentifrice. That is dangerous. It will injure the enamel of the teeth and irritate the gums, just as sand will scratch glass.

2. Or you can use a highly medicated dentifrice supposed to dissolve the deposits on the teeth with a chemical. This, too, is dangerous, for any chemical strong enough to accomplish this will damage the delicate mouth membranes.

3. But, if you want to be safe, brush the teeth with a dentifrice that has a fine chalk base which will polish the teeth but not scratch the enamel and also has just enough medication to soothe the tissues of the mouth.

This is the *safe* and *efficient* dentifrice.

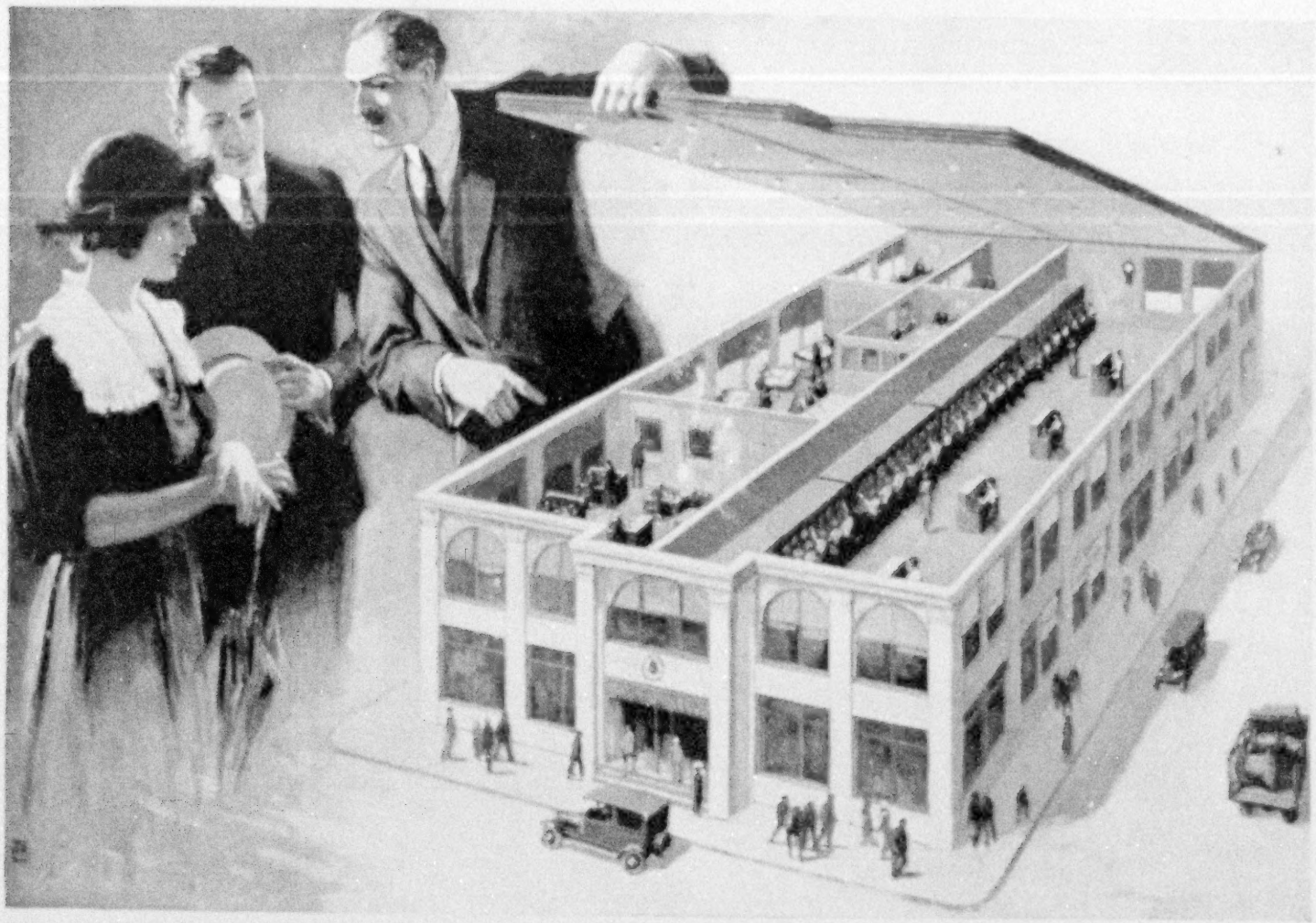
More dentists have recommended Colgate's as a safe and efficient dentifrice than any other. It has no grit. It has no harmful chemicals.

Which of the three ways will you choose?

. . . the safe, efficient dentifrice

Sold everywhere—or send two cents for trial size tube

COLGATE & CO. *Dept. 66* 199 Fulton Street, New York



The Public Confidence

An important part of the management of the Bell System is to keep the public informed concerning all matters relating to the telephone.

We consider this an essential part of our stewardship in the operation of this public utility. It is due not only the 130,000 shareholders, but it is due the whole citizenship of the country.

We have told you of new inventions to improve service, of the growth of service, of problems involved in securing materials, employing and training workers, of financing new developments, and of rates necessary to maintain service.

You have been taken into our confidence as to what we are doing, how we do it, why we do it. You have been told of our efforts to meet unusual conditions; of how we have bent every energy to provide service in the face of storms, floods, fires.

It is an enormous task today to provide adequate service in the face of shortage of workers, raw materials, manufacturing production and transportation.

Nevertheless the service of the Bell System has been improved and extended this year. Over 350,000 new stations have been put into operation. And the loyal workers of the Bell System are establishing new records for efficiency and will establish new records for service.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

One Policy *One System* *Universal Service*

"Mention The Geographic—It identifies you"

THE PURITANS were not oppressive or cruel. They tried hard to civilize and Christianize the Indians. But when, in 1636, the Pequot tribe committed unprovoked murders and finally burned the quiet settlement of Wethersfield, killed ten people and carried two girls into captivity, justice demanded stern measures.

An expedition of 77 colonists stormed the palisaded fort which sheltered over 700 Pequots, and in an hour's battle broke the Pequot power. This decisive defeat stilled the war whoop for nearly forty years.

Justice that protects individual and corporate rights, probity in commercial relations, industry and thrift—these are the solid foundations of New England.

This institution subscribes to the old New England standards. It enjoys intimate touch with leading New England enterprises; maintains regular channels for domestic and foreign financial service; possesses resources ample for all purposes. We cordially invite correspondence.

We shall be glad to send you our illustrated brochure, *"New England—Old and New"*—issued in commemoration of the Tercentenary of the first Landing in 1620. Address Department D.

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Ready—on the instant

The Pocket Premo

Snaps into exact focus, every time, as the front board drops.

The pictures it makes are 2¼ x 3¼: the picture of it, above, shows its extreme compactness.

Loads with 12 Exposure Premo Film Packs—"Just drop in a pack." Eastman-made film, of course.

Has Kodak ball bearing shutter, meniscus achromatic lens, seal grain leather covering (real leather). Refined finish throughout. Price, $13.85.

All Kodak Dealers Sell the Pocket Premo

Eastman Kodak Company

Rochester Optical Department Rochester, N. Y.

Those Pearly Teeth

Learn how people get them

All statements approved by high dental authorities

Millions of people have adopted a new teeth-cleaning method. Wherever you look you see pearly teeth nowadays. Let this ten-day test reveal what this method means to you.

End the cloudy film

Most teeth are dimmed by film. A viscous film clings to them, enters crevices and stays. Most tooth troubles are now traced to it.

It is this film-coat that discolors—not the teeth. It is the basis of tartar. It holds food substance which ferments and forms acid. It holds the acid in contact with the teeth to cause decay.

Millions of germs breed in it. They, with tartar, are the chief cause of pyorrhea, and very few people escape it.

The ordinary tooth paste does not dissolve it, so the tooth brush does not end it. Thus most people suffer from that film.

Now dental science, after years of searching, has found a way to combat it. Able authorities have amply proved its efficiency. Now leading dentists everywhere advise it, and millions of people have come to employ it.

Everyone is welcome

Now this new method is embodied in a dentifrice called Pepsodent. And everyone is welcome to a ten-day test.

Pepsodent is based on pepsin, the digestant of albumin. The film is albuminous matter. The object of Pepsodent is to dissolve it, then to day by day combat it.

Pepsin long seemed impossible. It must be activated, and the usual agent is an acid harmful to the teeth. But science has found a harmless activating method, and pepsin can be every day applied.

Two other new-day requisites are combined in Pepsodent. So this method in three ways brings unique results, and everyone should know them.

Send the coupon for a 10-Day Tube. Note how clean the teeth feel after using. Mark the absence of the viscous film. See how teeth whiten as the film-coat disappears. It will be a revelation.

Do this for your sake and your family's sake. Judge the method by results. Cut out the coupon now, for few things are more important than whiter, safer teeth.

Pepsodent PAT. OFF. REG. U.S.

The New-Day Dentifrice

A scientific film combatant which, after 5 years' tests, is now advised by leading dentists everywhere.

Druggists supply the large tubes

10-Day tube free

THE PEPSODENT COMPANY,
Dept. 730, 1104 S. Wabash Ave., Chicago, Ill.:
Mail 10-Day Tube of Pepsodent to

Only one tube to a family

XUM

GLIMPSE NO. 2 INTO THE SPIRIT OF AMERICA'S SECOND GREATEST INDUSTRY

Pride in *First Class Work* is the Label of Leadership

Nowhere else in the world does the science of *Lumbering* equal modern American methods. And no *hardwoods* in the world surpass the superb cabinet-woods of our own great eastern and mid-southern forests. (Knowledge of their extent today gives a sudden joy to people of cultured taste in *furniture* and *interior-trim*, some of whom had almost been led to actually believe in the early exhaustion of our native supply! Yet generations to come will share our present lavish privileges.)

The vista shown above is *two miles long*—a solid bed of *superior hardwood logs*, of *many species*, which in due course will yield over 12,000,000 board-feet of the best furniture, trim and specialty woods in the world today.

Notice the obscure *temporary railroad* at the right—laid (at heavy cost) to convey the thousands upon thousands of selected logs from their neatly arranged "stop-over" to the great mills which are to convert them into form for your most intimate and life-long uses.

It is a fascinating thought—as to *just which* of the logs seen above may contain the material for *your own new dining room set*, your new *phonograph cabinet* or the *interior trim* (or floors) of your *new home*—perchance this year, or next year (or even the year after.)

No matter when it happens, however, *you never will forget this photograph* of the superb logs, superbly "logged" and so proudly and skilfully handled, parts of which *some day or other* are to be *your very own.* (Really, the notion is distinctly interesting!—Isn't it?)

WRITE US—AND WATCH THIS PUBLICATION FOR *GLIMPSE NO. 3*

American Hardwood Manufacturers' Association

MEMPHIS, TENNESSEE

American Oak	Cottonwood	Elm	Sycamore	Willow
Red Gum	Chestnut	Beech	Tupelo	Lynn
American Walnut	Hickory	Basswood	Cherry	Magnolia
Poplar	Ash	Maple	Persimmon	et al.

(-)

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Under the Personal Direction of JOHN Mc E. BOWMAN, Pres.

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Library and Lounge, Restaurants, Cafés, Grills, Banquet Halls, Luxurious Turkish Baths, Sumptuous Suites, Private Dining Rooms.

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Grand Central Terminal
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The Belmont
JAMES WOODS, VICE-PRES.
Opposite Grand Central Terminal

Murray Hill Hotel
JAMES WOODS, VICE-PRES.
A Short Block from the Station

ALSO The Ansonia
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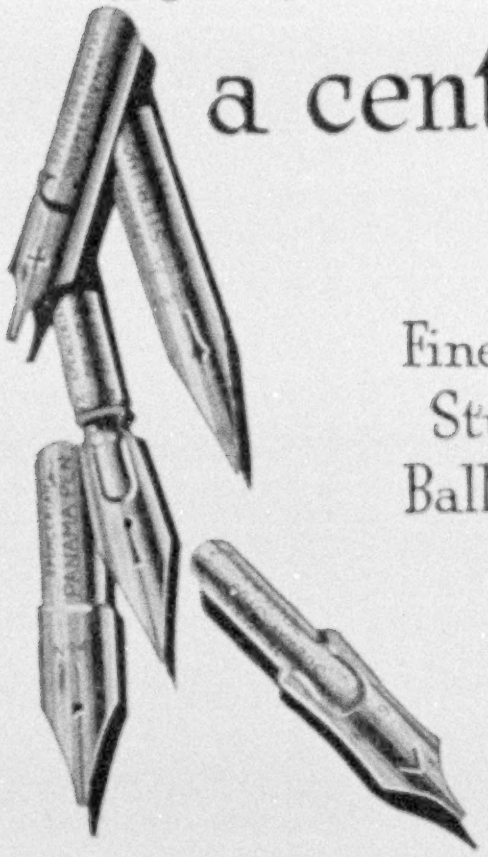
Broadway at 73rd Street
in the Riverside residential section

PERSHING SQUARE HOTELS, NEW YORK

The Standard for over half a century



Fine Medium, Stub and Ball pointed

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PERSONAL

Steel Pens

Spencerian Pens are as tried and true as your old copy-book axioms. They are better than ordinary pens because they write smoother and last longer. We want you to know the superiority of Spencerian Pens. *Send 10c. for ten different sample pens and a pen holder.*

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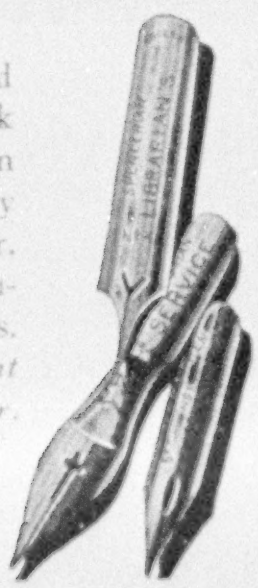

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It requires sympathetic understanding, the training of an artist, and long experience to express personality truly and appropriately in a lasting memorial.

74 years of successful experience have made our service the kind you will appreciate.

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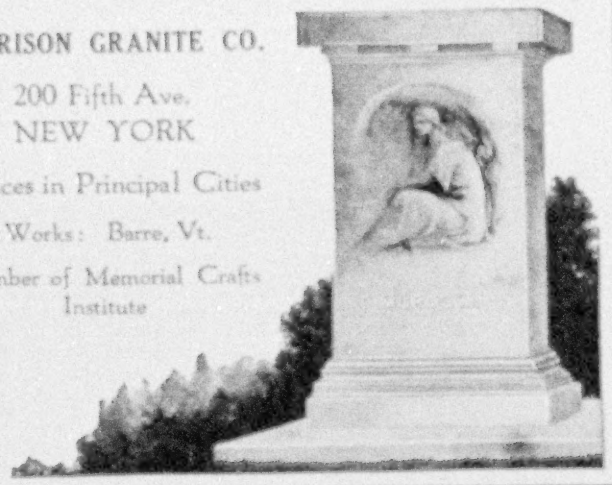
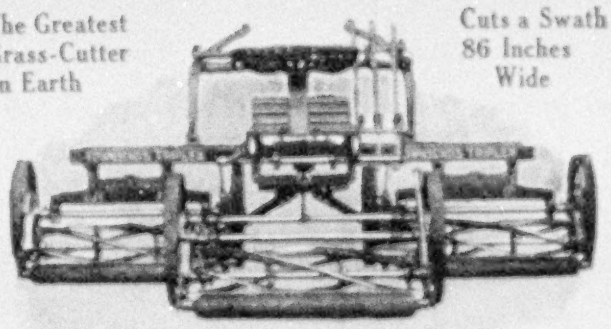


TOWNSEND'S TRIPLEX

The Greatest Grass-Cutter on Earth

Cuts a Swath 86 Inches Wide



Floats Over the Uneven Ground as a Ship Rides the Waves

One mower may be climbing a knoll, the second skimming a level, and the third paring a hollow. Drawn by one horse and operated by one man, the TRIPLEX will mow more lawn in a day than the best motor mower ever made; cut it better and at a fraction of the cost.

Drawn by one horse and operated by one man, it will mow more lawn in a day than any three ordinary horse-drawn mowers with three horses and three men.

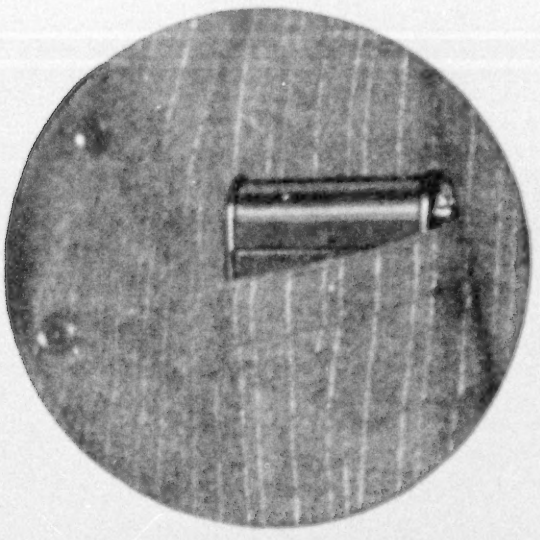
Does not smash the grass to earth and plaster it in the mud in springtime, neither does it crush the life out of the grass between hot rollers and hard, hot ground in summer, as does the motor mower.

The public is warned not to purchase mowers infringing the Townsend Patent, No. 1,209,519, December 19th, 1916.

Write for catalog illustrating all types of Lawn Mowers.

S. P. TOWNSEND & CO.
254 Glenwood Avenue Bloomfield, N. J.

You don't carry a



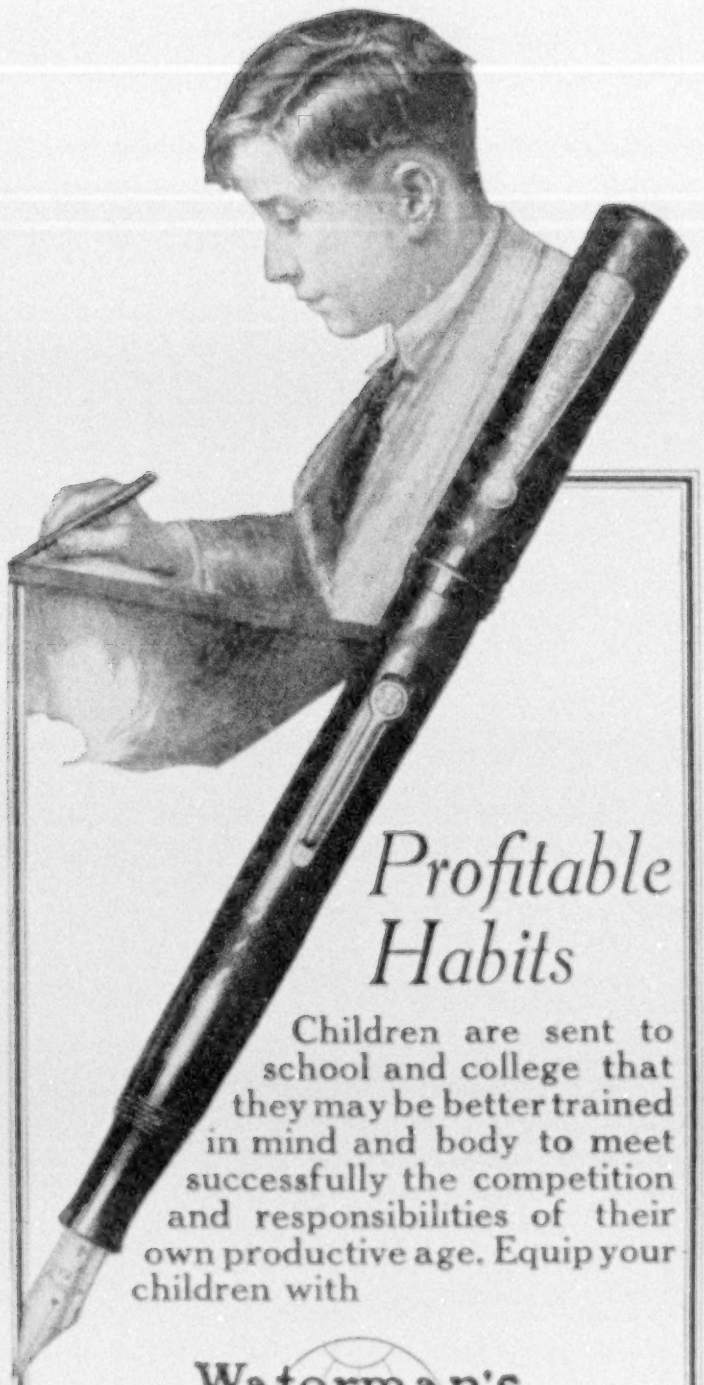
Vest Pocket Kodak;

you wear it, like a watch.

Your larger camera you carry when you *plan* to take pictures. The Vest Pocket Kodak you have constantly with you to picture the unexpected and the unusual. **It is small in size** but lacks nothing in quality.

The price is $9.49. **Film for 8 exposures** is 25 cents. Both prices include the war tax.

Eastman Kodak Co., Rochester, N. Y., *The Kodak City*



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Children are sent to school and college that they may be better trained in mind and body to meet successfully the competition and responsibilities of their own productive age. Equip your children with

Waterman's Ideal Fountain Pen

It teaches unconsciously habits of neatness, exactness, and fluent expression, all of which contribute greatly to a successful career.

Business men and women, the world over, have found its greater convenience and absolute reliability an indispensable part of their everyday equipment.

Three types:
Regular, Safety and Self-Filling
$2.50 and up at Best Dealers

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Chicago Boston San Francisco

TYROL WOOL
REG. U.S. PAT. OFF.

Tyrol Wool is a fabric that has endless wear—strictly plain tailored in models that are most attractive.

Ladies' and Misses' Plain Tailored Suits
$34.75 $38.75 $39.75

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Special Junior Suits
The Practical School Suit
$29.75

Catalog and Samples on Request

Mail Orders Filled

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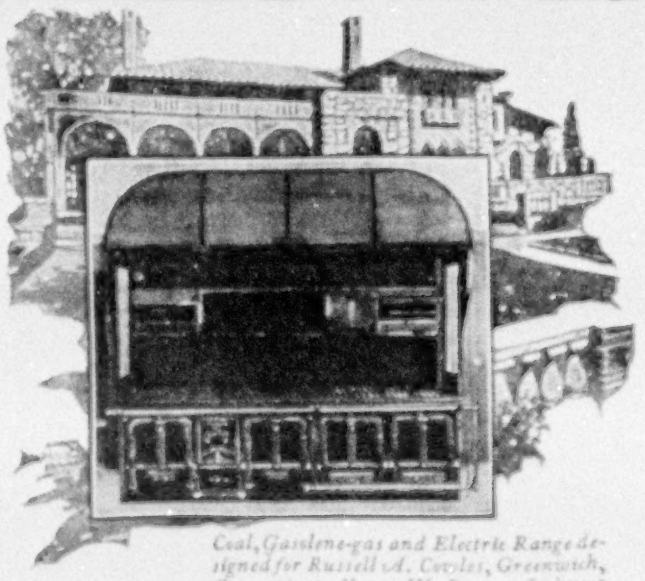
PHILADELPHIA, PA.



Coal, Gasolene-gas and Electric Range designed for Russell A. Cowles, Greenwich, Connecticut, Henry W. Rowe, Architect

Deane French Range

A RANGE designed to meet the needs of your home will insure you greater comfort. If you will tell us the size of your family, the fuels you prefer and the floor space available we will submit a design of a range that will meet your requirements. Let us send you *The Heart of the Home*, our portfolio of built-to-order ranges

BRAMHALL, DEANE CO.
261-263 West 36th St., New York, N.Y.

When You Order Corn Flakes

It's a good idea to bear in mind

POST TOASTIES

There are many brands of corn flakes—of varying degrees of thickness, crispness and firmness—as well as degrees of flavor.

Post Toasties will please you because they are superior in every qualification which means economy, satisfaction and pride in service.

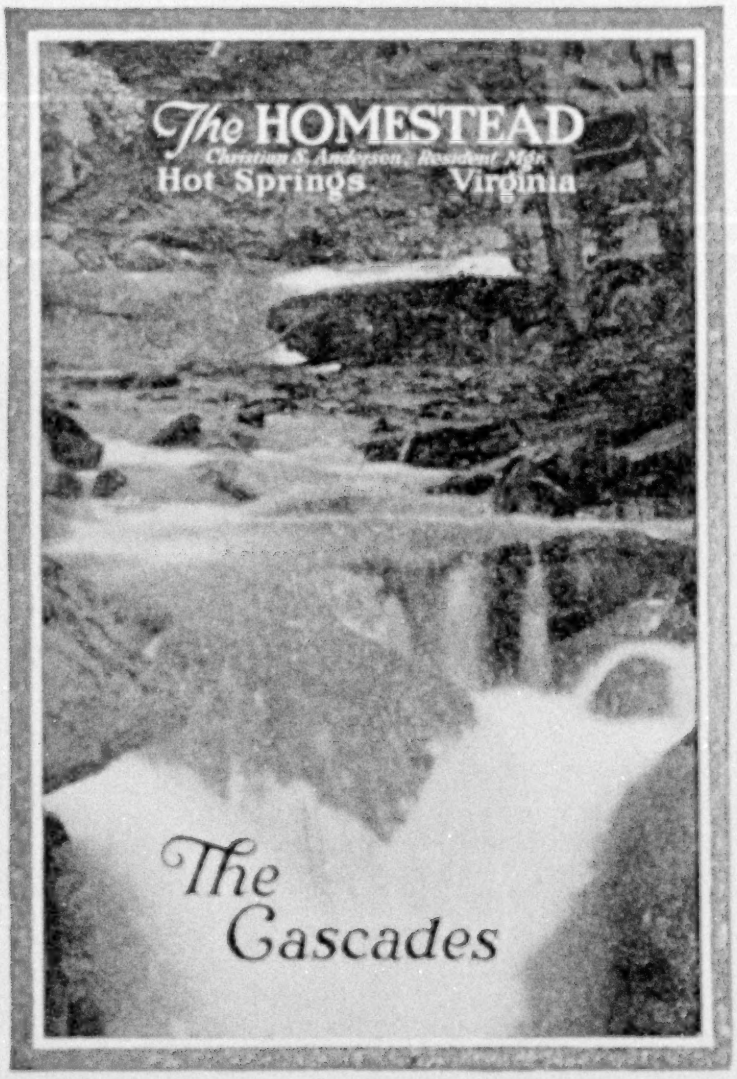
Post Toasties Are Superior Corn Flakes

The care used in their manufacture, from selection of material to finished package, through all the processes of making, insures the highest quality.

Post Toasties come to you fresh, crisp and delightful—

At All Grocers

Made by Postum Cereal Co., Inc., Battle Creek, Mich.



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IN THE

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The Membership Fee Includes Subscription to the National Geographic Magazine

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To the Secretary, National Geographic Society,
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I nominate .....

Address .....

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for membership in the Society

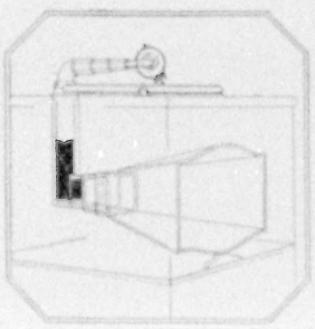
.....

.....

9-20 *Name and Address of Nominating Member*

The CHENEY

ALL MUSIC FINDS FULL AND TRUE EXPRESSION IN ITS MELLOW TONES



The Cheney Acoustic Throat

The HUMAN VOICE *and The Cheney*

THE BEAUTY of the human voice as bestowed by nature, can hardly be surpassed. And its principles, adapted to THE CHENEY, give rare beauty to the playing of this instrument.

Just as sounds are gathered and controlled in the living human throat, so are sound vibrations gathered and controlled in the acoustic throat of THE CHENEY.

THE CHENEY TALKING MACHINE COMPANY • CHICAGO • DEALERS EVERYWHERE

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144 *New* Picture-Story Wonder Sheets

to

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At the earnest request of thousands of teachers who, in daily class use, have found the first 144 sheets invaluable in teaching geography, the Society has added 144 new sheets dealing with the Indians, China, Philippines, African Negro, and Italy. The Eskimo and Sahara sets have been combined into one set of 48 sheets. The six sets are readily adaptable to any course of study and are ideal for home use in encouraging children to read "worth-while" books and enjoy good pictures.

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I enclose $..... Please send number of sets indicated at $1.50 per set; $4.00 for 3 **different** sets; or $8.00 for all 6 sets, postpaid in the United States.

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(9-20)

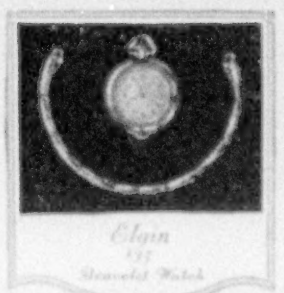
The Table Clock

NOT until cathedral clocks had boomed out the hours for centuries, did it occur to anyone to bring them down to earth in miniature form—as Table Clocks. To this invention, some wit has ascribed the origin of that paternal classic, "Tut, tut! Time that young man went home!"

Ornate in design, elaborate in workmanship, they were found only in the homes of a wealthy few. The hour hand was sometimes mounted on a large bell, and curved to meet the dial figures on the rim. The meaning of the minute was still undreamed of—why think of minutes when clocks varied an hour a day?

Material, construction, adjustments and service fully covered by Elgin Guarantee . . . .

Yet the Table Clock—plaything of the rich, but logical forerunner of *portable* clocks, or "watches"—brought the old world a long stride forward toward the timekeeping marvels of the Twentieth Century—



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People of culture and refinement invariably PREFER Deities to any other cigarette

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Makers of the Highest Grade Turkish and Egyptian Cigarettes in the World

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CODFISH, FRESH LOBSTER

FOR THE CONSUMER — NOT THE DEALER

FOR YOUR OWN TABLE

FAMILIES who are fond of FISH ought to get them DIRECT from GLOUCESTER, as no inland dealer anywhere else can possibly be in a position to offer you goods as perfect and wholesome as we can.

We sell ONLY to the CONSUMER DIRECT, not through grocers or markets. We want to supply YOU, no matter how small your requirements.

We have done a mail-order fish business for thirty years, sending the goods RIGHT TO OUR CUSTOMERS' HOMES, EXPRESS PREPAID EAST OF KANSAS, and guaranteeing complete satisfaction or money refunded.

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Our SALT MACKEREL are tender, juicy fellows—broiled for breakfast they are delicious. SALT CODFISH selected and prepared by our method is unexcelled.

Much of the fresh fish you buy in the market is at least several days old. OUR CANNED FISH, being STEAM STERILIZED, is ABSOLUTELY FRESH.

Our FRESH LOBSTERS, in parchment-lined cans, go through no process except boiling (no preparation of any kind being used). Opened and packed solid in whole pieces as soon as taken from the water, they retain their crispness and natural flavor. CRABMEAT, SHRIMP and CLAMS have likewise a perfectly natural appearance and taste.

Our SALMON, TUNNY and IMPORTED FISH DELICACIES are always the best produced.

A selection of our FISH PRODUCTS should always be in your STORE-ROOM for daily use and for the preparation at a moment's notice of dozens of dainty or substantial dishes.

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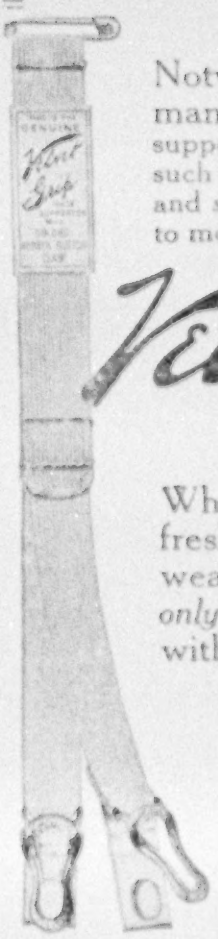

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Notwithstanding that there are many different kinds of hose supporters we believe none has won such an enviable reputation for *quality* and *service* or given so much *satisfaction* to mothers and children as the

Velvet Grip

HOSE SUPPORTER

Why? Because the webbing of fresh live rubber feels better and wears longer. Because it is the *only* hose supporter equipped with that exclusive feature, the

All Rubber Oblong Button

Because It Saves Hosiery

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Makers of Velvet Grip Hose Supporters for Women, Misses and Children and the Famous BOSTON GARTER for Men

The All-Rubber Oblong Button Prevents Slipping and Ruthless Ripping.

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SPECIAL-SIX

Judge the SPECIAL-SIX by its power, quick getaway, ease of handling, economy—any test you choose—and you will be convinced that it is the outstanding value among five-passenger cars.

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50-H. P. detachable-head motor; 119-inch wheelbase, giving maximum comfort for five passengers. All Studebaker Cars are equipped with Cord Tires—another Studebaker precedent.

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Touring Car . .	$1485
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Touring Car . .	$2350

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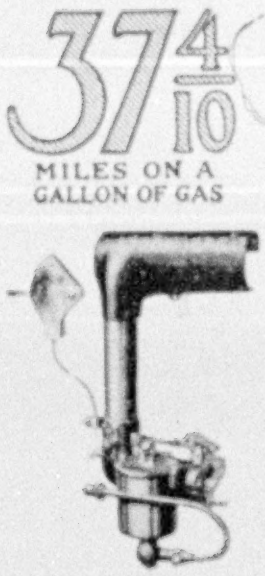
"This is a Studebaker Year"

37 4/10 MILES ON A GALLON OF GAS



Are You Getting Anywhere Near That—From Your Ford?

Suppose you are getting twenty-two miles on a gallon of gas. Then suppose you increase that mileage to THIRTY. There are eight miles of *added travel*—motoring that doesn't cost you a red cent more than you are now paying—a reduction of approximately *thirty-three and one-third per cent.*

The New Stromberg Carburetor for Fords HAS caused just such astounding cost reductions for tens of thousands of Fords.

It established the World's official economy record. A mileage feat that has never been equaled—37 4/10 miles on a single gallon of gasoline.

Ready for immediate installation. Equipped with new improved easy starting attachment. Call on your local dealer or write us for descriptive matter. Beat the high cost of gas. Make your Ford a far more dependable and a far more economical car than ever before.

STROMBERG MOTOR DEVICES CO.

64 East 25th Street Chicago, Ill.

New STROMBERG CARBURETOR Does it!

Your Closet Bowl—Spotless and Sanitary

Scrubbing the closet not only mars and roughens the surface of the bowl but is an unpleasant and unnecessary task. Sprinkle a little *Sani-Flush* into the bowl, according to directions—flush, and the work is done.

THE HYGIENIC PRODUCTS COMPANY
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Canadian Agents:
HAROLD F. RITCHIE & CO., Ltd., Toronto

If your dealer cannot supply you at once send us 25c in coin or stamps for a full-sized can postpaid. (Canadian price, 35c; foreign price, 50c.)

Sani-Flush

TRADE MARK REG. U.S. PATENT OFFICE

Cleans Closet Bowls Without Scouring

A square meal for your DOG and a square deal for your POCKETBOOK

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SPRATT'S DOG CAKES *and* PUPPY BISCUITS

are made as only SPRATT'S know how.

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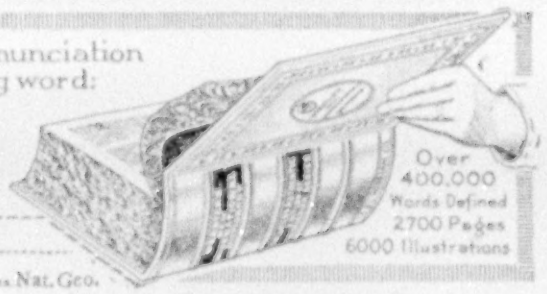


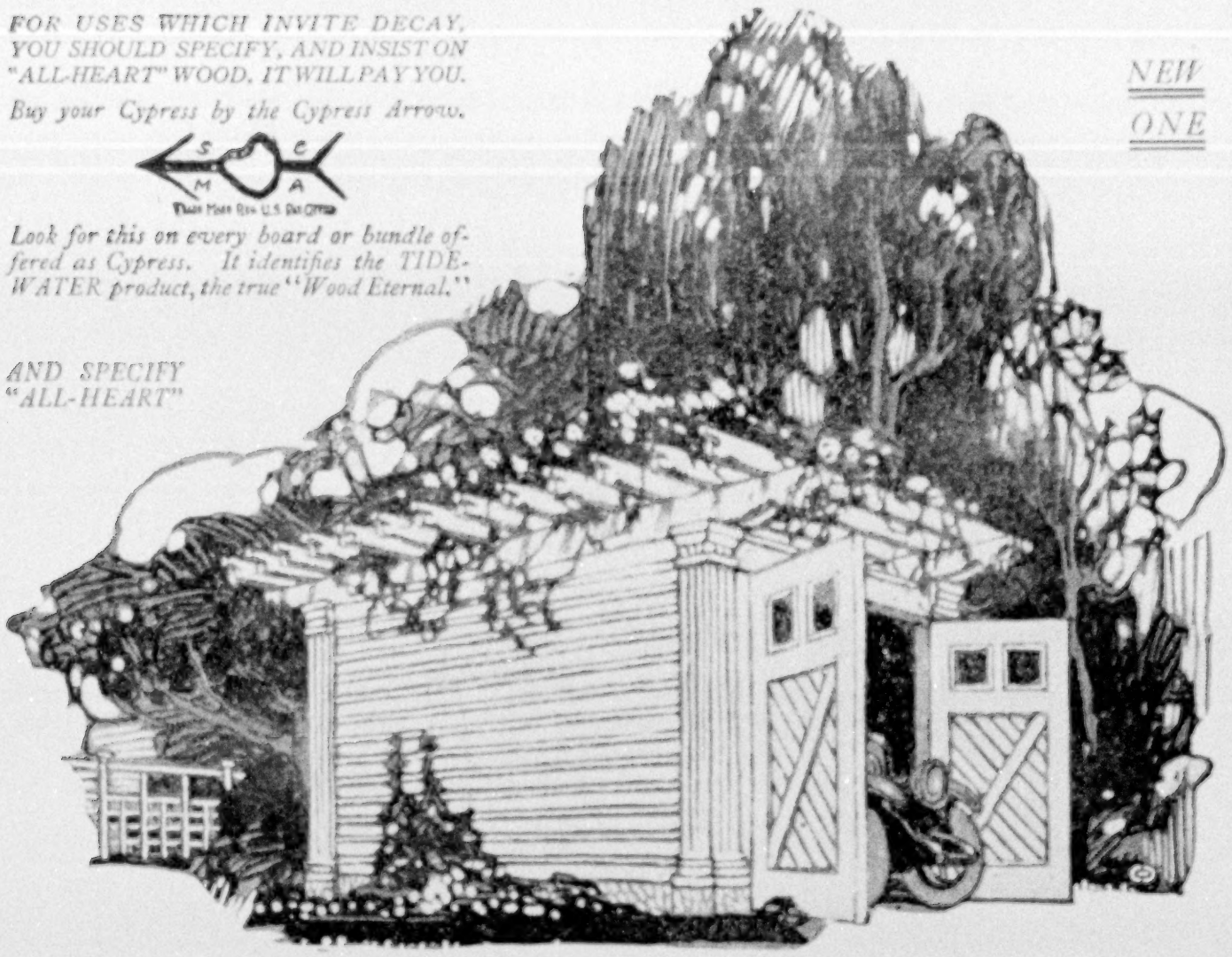
FOR USES WHICH INVITE DECAY, YOU SHOULD SPECIFY, AND INSIST ON "ALL-HEART" WOOD. IT WILL PAY YOU.

Buy your Cypress by the Cypress Arrow.

Look for this on every board or bundle offered as Cypress. It identifies the TIDE-WATER product, the true "Wood Eternal."

AND SPECIFY "ALL-HEART"

NEW ONE



The Cypress "Pergola-Garage"

Why should a garage be homely? This one isn't.—(Is it?)

The man driving out is the owner. He is well satisfied with the fact that he has enhanced the beauty of his grounds at the same time that he has protected his car.

The picture shows how *your* garage may look if you will allow us to send you, with our compliments, and with no obligation at all, the

Complete Working Drawings (on sheet 24 x 36 inches)

including full specifications—enough for any good carpenter to build from. Perhaps you enjoy such work yourself. If so, you can't go wrong.

It might even be possible to remodel your present garage on these lines. If you do so, of course you will know what kind of lumber to buy. "If you build of Cypress you build but once." You know "the Wood Eternal" is the champion pergola lumber—does not tend to shrink, swell or warp like so many woods—takes paint and stain beautifully, but *does not need either*, except for looks—lasts and lasts and lasts and lasts without them. (See U. S. Govt. Rept., reprinted in full in Vol. 1, Cypress Pocket Library. Just mention that you'd like this book, also.)

This Pergola-Garage is AN ADDED SUPPLEMENT

to the 9th big reprint of VOLUME 28 of that home-lovers' guide, counselor and impartial friend, the famous Cypress Pocket Library. It's FREE. Will you write?

When planning a Pergola, Mansion, Bungalow, pasture-fence or sleeping porch, remember, "*With CYPRESS you BUILD BUT ONCE*"

CYPRESS DEFIES DECAY!

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU *MORE*. Our entire resources are at your service with Reliable Counsel.

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INSIST ON TRADE-MARKED CYPRESS AT YOUR LOCAL LUMBER DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

A Garden Full of Darwin Tulips

PLANT NAMED VARIETIES IN YOUR GARDEN THIS FALL

The purpose of offering **10 named varieties of Giant Darwin Tulips** to the readers of National Geographic Magazine is to acquaint them with the possibilities of planning their spring display according to a color scheme.

The following ten varieties, if planted in the order named, will give a good color scheme.

Loveliness. One of great merit for bedding as well as borders. Soft carmine-rose. Borne on stems 21 inches long.
10 bulbs, 70c.; 100 bulbs, $6.00

Clara Butt. Beautiful clear salmon-pink. No other variety offered by us has the same distinctive and pleasing color. Borne on stems 22 inches long.
10 bulbs, 60c.; 100 bulbs, $5.00

The Sultan. Rich maroon-black; a flower of attractive and distinctive coloring. Grow to height of 25 inches.
10 bulbs, 60c.; 100 bulbs, $5.00

Reverend Ewbank. Soft lavender-violet, slightly shaded silver-gray. Borne on stems 23 inches long. 10 bulbs, 70c.; 100 bulbs, $6.00

Massachusetts. A long and beautiful flower, clear carmine-rose at midrib, toning off to soft pink at edges. Borne on stems 26 inches long. 10 bulbs, 70c.; 100 bulbs, $6.00

Pride of Haarlem. Magnificently formed flower of immense size, of a brilliant deep rose, shaded scarlet, with light blue base. Sometimes attaining height of 3 feet.
10 bulbs, 70c.; 100 bulbs, $6.00

Purple Perfection. Bright glossy purple, large in size and of wonderful substance. Grows to a height of 26 inches.
10 bulbs, 85c.; 100 bulbs, $7.50

White Queen. A splendid white variety; when first opening pale rose, but quickly turns white. 10 bulbs, 60c.; 100 bulbs, $5.00

Europe. Deep, fiery crimson, with white base. Flowers large and erect. Height 20 inches.
10 bulbs, 70c.; 100 bulbs, $6.00

Glow. The deepest shade of crimson-scarlet; a color of wonderful brilliance, not unlike that of the Oriental poppy. Borne on stems 20 inches long.
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Our 1920 Fall Bulb Catalogue sent on request

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Cutting large plots of grass with hand mowers is a tedious, expensive job. Labor is scarce and its cost is high.

If you are encountering difficulties in securing labor—if the cost of keeping your lawn in good condition is becoming excessive the Ideal Power Lawn Mower will solve your problems.

Being a power mower and roller in one, the Ideal permits economical *year round care.* Cuts from four to five acres of grass per day and is used with great success on private estates, public parks, cemeteries, golf courses, etc.

The Ideal is simple and trouble-proof. Any one can operate it. Sold on a guarantee of positive satisfaction. Write for literature and details, also for name of our nearest dealer.

Ideal Power Lawn Mower Co.
422 Kalamazoo St.
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"Does the work of 5 Hand Mowers"

When wild ducks or geese honk, or Bob White whistles, let the youngsters ***see*** the very bird whose call has so aroused their interest in nature.

Book of Birds

250 Full-Color Paintings

Fascinating Descriptions

Many sportsmen use it to settle disputes as to game birds they have seen on wing or in thicket.

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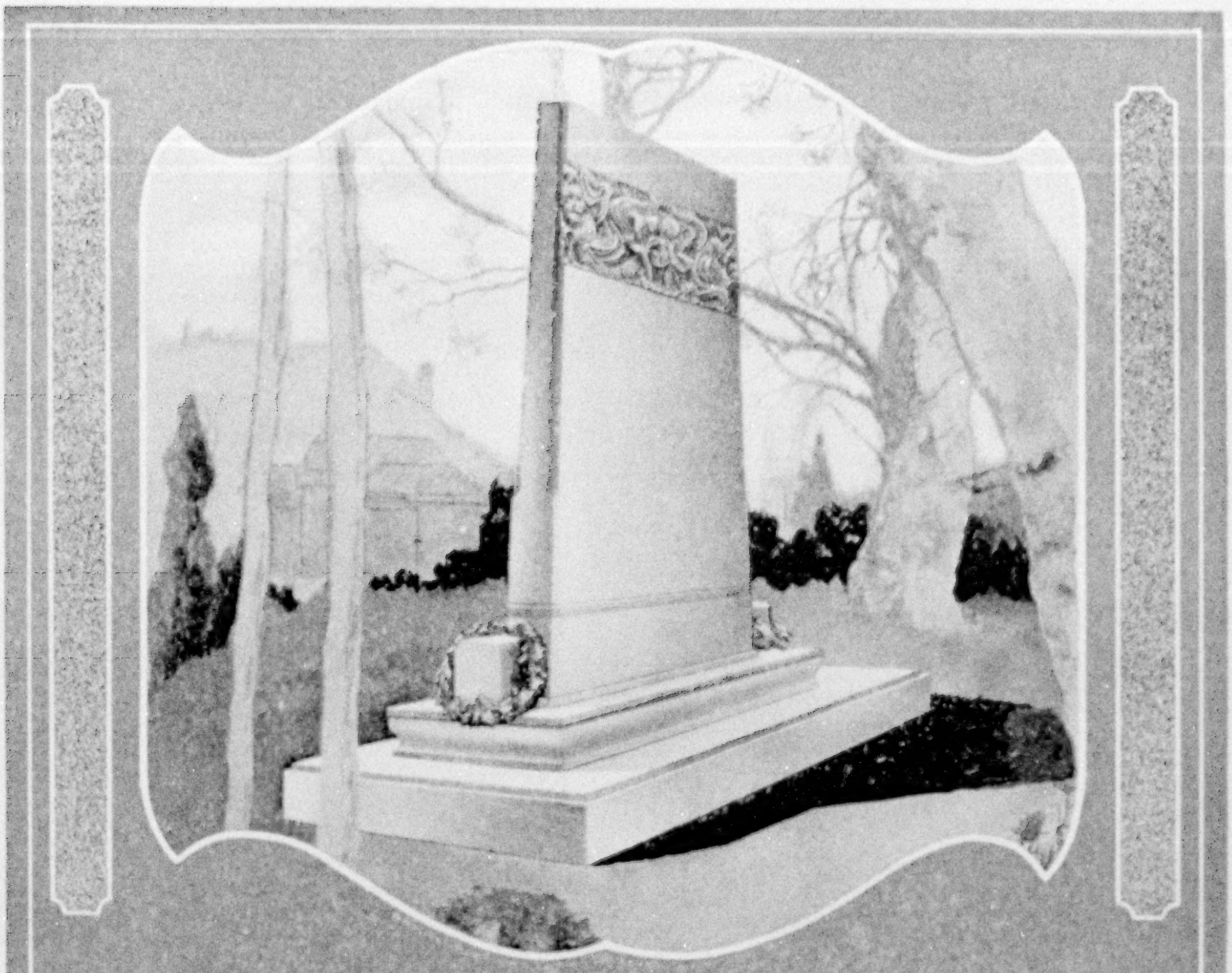

Our Honored Dead

Tribute in splendid and imperishable form may be paid to their memory through the erection of a memorial of ROCK OF AGES GRANITE.

Fine of texture and of a beautiful light-gray color, ROCK OF AGES GRANITE is pre-eminently suitable for a memorial to the American Soldier.

A copy of our descriptive booklet will be mailed on request.

BOUTWELL, MILNE & VARNUM CO.

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Quarriers of

ROCK OF AGES

GRANITE

Refer to Dept. E

ROCK OF AGES TRADE MARK

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the Granite Center of

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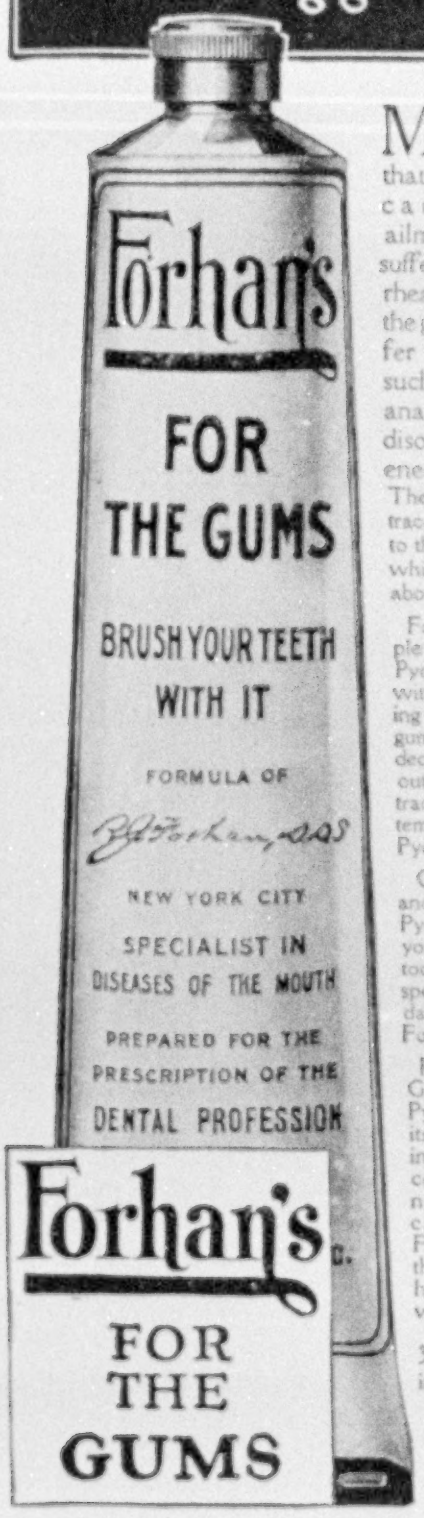
Science proves the danger of bleeding gums



MEDICAL science proves that unhealthy gums cause serious ailments. People suffering from Pyorrhea (a disease of the gums) often suffer from other ills, such as rheumatism, anaemia, nervous disorders, or weakened vital organs. These ills have been traced in many cases to the Pyorrhea germs which breed in pockets about the teeth.

Four out of five people over forty have Pyorrhea. It begins with tender and bleeding gums. Then the gums recede, the teeth decay, loosen and fall out, or must be extracted to rid the system of the infecting Pyorrhea germs.

Guard your health and your teeth. Keep Pyorrhea away. Visit your dentist often for tooth and gum inspection, and make daily use of Forhan's For the Gums.

Forhan's For the Gums will prevent Pyorrhea—or check its progress—if used in time and used consistently. Ordinary dentifrices cannot do this. Forhan's will keep the gums firm and healthy, the teeth white and clean.

35c and 60c tubes in U. S. and Can.

FORHAN CO.
New York

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PRINCE *An* ARROW COLLAR

The right little collar for the tight little knot

CLUETT, PEABODY & CO., Inc., Troy, N.Y.

Don't Grope for Words

We are all trying to SELL something—it may be brains, or automobiles, or soap—but words are the universal medium of exchange. LEARN TO USE THEM CORRECTLY—PROFITABLY. Get a command of English! Spend a few minutes daily with Grenville Kleiser's Mail Course in Practical English and Mental Efficiency. It will quickly teach you how to

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10 Buys ¢100

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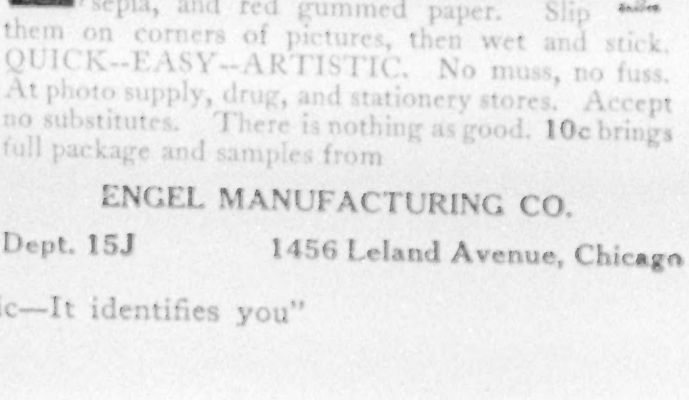

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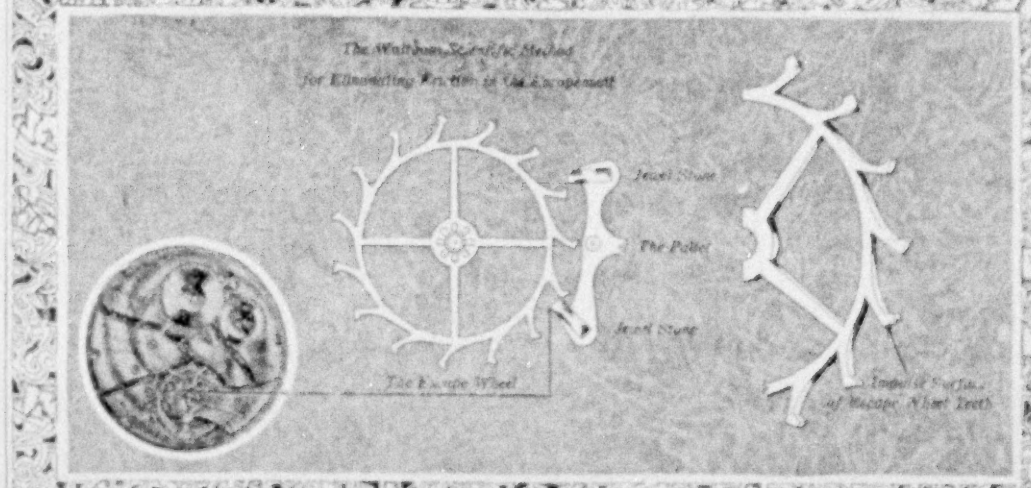
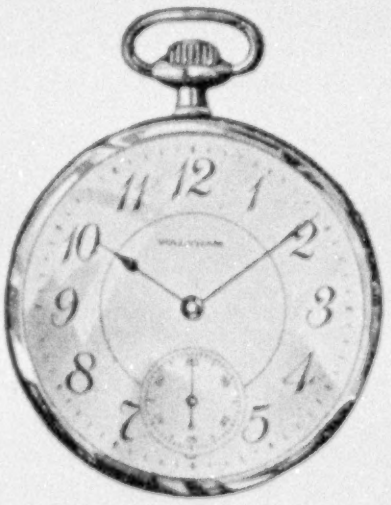


THE MOST SCIENTIFICALLY BUILT WATCH IN THE WORLD

The Waltham Scientific Method for Eliminating Friction in the Escapement Which Means Accurate Time-keeping and Dependability of Your Watch

THE pallet stones (pieces of selected Ruby or Sapphire perfectly formed in rectangular shape and highly polished) check the power which comes from the mainspring in your watch and then release it 18,000 times or beats per hour.



The Riverside

The most dependable moderate price watch in the world

$75 and up

In these governing functions of the escape-wheel an impulse is given to the balance-wheel, which is transferred in governed movement, called Time, to the hands of the watch.

Think, for a moment, of the possibility of friction, where the pallet jewels slide over the impulse surface of the escape-wheel teeth (illustrated above) 432,000 times every twenty-four hours!

Here was an opportunity for Waltham invention to minimize friction practically to the vanishing point. And friction is the most insidious and dangerous enemy to correct time-keeping in the works of a watch.

After years of experiment and development, Waltham invented a machine equipped with a diamond cutter which not only cut the diameter of the escape-wheel to its exact size, but left the impulse surface of the teeth so perfectly shaped (rounded) and highly polished that when the face of the pallet stones (jewels) slid across that surface, friction was practically reduced to its ultimate minimum.

It can readily be seen that this development of the diamond cutter has given the Waltham Watch a positive and valuable advantage in time-keeping and unvarying performance.

The ordinary method of making an escape-wheel is to polish with some polishing compound, which being composed of gritty elements cannot be used without particles of grit becoming embedded in the polished surface. This in time roughens the surface of the pallet stones, eventually causing greater friction and consequent variability of time-keeping.

The Waltham Scientific Method, then, of cutting and polishing with a cutter made from a diamond is another hidden, yet vitally important, superiority in the "works" of a Waltham Watch which provides an unanswerable reason why your watch selection should be a Waltham.

This story is continued in a beautiful booklet in which you will find a liberal watch education. Sent free upon request. Waltham Watch Company, Waltham, Mass.

WALTHAM

THE WORLD'S WATCH OVER TIME

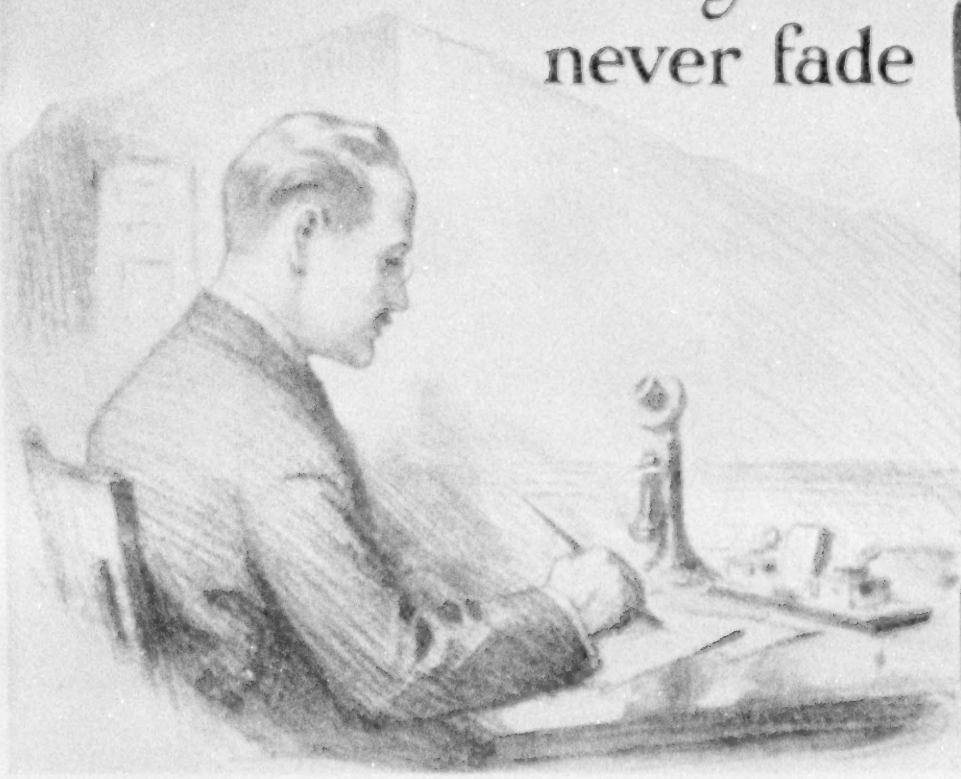
Records that Last

Records
carved on
stone last
Forever

Records
written with

SANFORD'S

Premium Writing Fluid
never fade



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Puts service into Rubber

RUBBER'S USEFULNESS was permanently increased the day it was discovered that ZINC OXIDE gave it greater strength, durability and resiliency.

ZINC OXIDE, properly compounded with crude rubber, changes the rubber from a material with limited usefulness to one which serves many needs in human activities. It adds endurance to rubber articles of every variety—*boots, shoes, coats, automobile tires, surgical goods,* etc.

The New Jersey Zinc Company supplies the rubber industry with high quality ZINC OXIDE of such great uniformity that it can be incorporated into formulas year after year with dependable results.

Our own mines, extensive plant facilities and more than 70 years' experience in manufacturing ZINC Products assure our customers a constant supply of ZINC Products of uniform quality. The cooperation of our Research Department is at the service of our customers who seek to effect greater economy and increased output by the use of our products.

THE NEW JERSEY ZINC COMPANY, *160 Front Street,* New York
ESTABLISHED 1848

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PITTSBURGH: The New Jersey Zinc Co. (of Pa.), 1439 Oliver Building

Manufacturers of Zinc Oxide, Slab Zinc (Spelter), Spiegeleisen, Lithopone, Sulphuric Acid, Rolled Zinc Strips and Plates, Zinc Dust, Salt Cake and Zinc Chloride

The world's standard for Zinc products

New Jersey
Zinc

BEAUTY that is strong and strength that is beautiful—*the mark of the masterpiece*—inseparably entwined in the master tire—*The Silvertown Cord.*

Goodrich Silvertown

America's First CORD TIRE

FOUNDED 1870

TRADE MARK

The Goodrich Adjustment Basis: Silvertown Cords, 8000 Miles; Fabric Tires, 6000 Miles

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The Orient tours arranged for next fall include visits to Japan, Korea, Manchuria, China, The Philippines and Java. Each party limited to fifteen. Departures from San Francisco September, October, November, and December. Special cruise to the South Sea Islands sailing October 20.

Around the World Six tours visiting the principal cities of the world. Four will start in September, October, November, and December sailing west, and two in October and November sailing east. Parties limited to twelve. All accommodations the best available.

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OLD Dutch Cleanser quickly and thoroughly cuts the grease and obstinate burnt-in crusts from cooking utensils. Leaves them shining and sanitary.

Reliable, gives better results, saves time and labor. Use it for all household cleaning.

Old Dutch is free from dangerous caustics and acids. Doesn't roughen or redden the hands.

The Quality insures Economy and Efficiency